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MODERN TRANSPORT

"THE TIMES" OF THE TRANSPORT WORLD

P.S.V. DEVELOPMENTS IN GERMANY

See Page 5

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CURRENT TOPICS

Enough Road Schemes in Readiness?

MINGLED with universal admiration of the Minister of Transport's vigorous advocacy of the new roads programme and of his success in driving it onward, there has been some criticism that the rate of build-up is insufficient and that the original impetus is being lost. Mr. Watkinson has produced two perfectly good answers: first, that we have made an auspicious start; second, that within the limits imposed by a democratic society, with its innate respect for individual rights and property, he is accelerating the preparation of schemes through the forward planning stage so that they are ready for authorisation. Now the British Road Federation, in a memorandum to the Chancellor of the Exchequer, complains that the rate of authorisation in the present four-year programme must slow down unless a larger sum is placed at the disposal of the Minister. In the first year of the current 1958-62 plan, £106 million of new expenditure has already been authorised, leaving only £174 million for the remaining three years—less than £60 million a year. The B.R.F. acknowledges that a major road scheme takes at least four years to come to the authorisation stage, but it wants the present allocation of £280 million to be trebled. There is justification for this view only if it can be shown that sufficient work is at the authorisation stage now, or will be within the next two or three years, to take up the increased capital allocation. It should be noted that since the first four-year road programme began in 1954 £263 million of work has been authorised, but only £97 million has been actually voted and the annual rate of expenditure (£41 million) is some way short of the peak target of £70 million. The limiting factor is still planning and the necessary statutory processes.

Surprises on Preston By-Pass

WHILE acknowledging the spectacular first fruits of the road programme, marked by the opening last week by the Prime Minister of the Preston by-pass, Britain's first highway built to motorway standards, the B.R.F. feels that the scale of expenditure is still too low in relation to the problem, which is the legacy of past indifference. Last year a conference of highway experts concluded that annual investment in roads should be at least three times the present level and calculated that the time-cost delay caused by inadequate roads was costing the nation £500 million a year; moreover this bill increases at double the rate of traffic growth. It cannot now be pretended that manpower resources, materials and machinery are not available. After a hectic opening weekend, when all the world and his wife turned out to sample the novel delights of a really open road, the eight-mile Preston by-pass has apparently relapsed into something like somnolence, with only 100-200 vehicles an hour in either direction. On Sunday there had been as many as 1,000 an hour and at the Broughton end much congestion ensued as vehicles queued to get back on to the old road. If this is to be a frequent experience—as it may well be during summer months—the third lane for which provision has been made will be required sooner than anticipated. As it is, congestion is likely to persist at peak periods until the link with the Lancaster by-pass is put in. No date has been announced for this work.

Atlantean in Service

SOME relief of problems concerned with regular heavy lifts of passengers on its routes serving Seacombe Ferry can be expected by Wallasey Corporation Transport Department as it brings into service the 13 Leyland Atlantean double-deckers ordered from Leyland Motors, Limited. The first of these was due to go into service on Wednesday after it had been formally handed over to the Mayor of Wallasey by Mr. J. S. Lees of Leyland. Wallasey Corporation Transport, of which Mr. W. R. Goodier is general manager, is the first of the municipal operators to take delivery of the Atlantean; these units are equipped with M.C.W. 77-seat coachwork, but general endorsement of the suitability for urban work of this unconventional design is evident in the volume of orders placed by both municipal and company undertakings. Leyland has already announced that they reach a value of nearly £3,000,000. The Atlantean is notable for having its diesel engine mounted across the chassis at the rear, from which position it can be very quickly removed, complete with the automatic friction clutch, automatic or semi-automatic gearbox and the cooling and fuel systems. Bodywork associated with the Atlantean is remarkable for its high capacity—up to 78 seats can be accommodated—in normal 30 ft. by 8 ft. dimensions. An enclosed front platform is provided, under the eye and control of the driver; a single low step gives access. With its higher capacity for dealing with peak loads, operating costs said to be no higher than those of a normal double-decker, the possibility of platform accidents is reduced or eliminated and the conductor is freed for fare collection only. The Atlantean should thus introduce a new high level of operating efficiency.

International Bodies Co-operate

RECENT negotiations have led to a close working agreement between two of the international bodies representative of transport interests—the International Union of Public Transport or U.I.T.P. and the International Union of Railways or U.I.C. A protocol has been drawn up under which the unions will exchange documents and publications; each can be represented at meetings of the other under certain circumstances when matters in which they are directly concerned are being discussed; the secretariats will maintain a permanent liaison; and if the need is felt, the two organisations may set up a study group for the joint examination of any question which calls for close collaboration. Joint studies which appear likely to take on a permanent character are provided for by special regulations laid down in appendices to the protocol. This agreement is a happy outcome of the two bodies being brought together by the common problems of public service by road and rail and is a milestone in the concerted efforts of public transport to remain in the forefront of service to the people. The U.I.C. also participates in the deliberation of such bodies as the International Chamber of Commerce, International Container Bureau, the International Consultative Committee on Telegraphy and Telephony, and the International Electro-Technical Commission.

Auckland Harbour Bridge

ON December 1 span No. 3 of the Auckland Harbour Bridge, 580 ft. long and weighing approximately 1,000 tons, was successfully floated into place at a height of 75 ft. above the water. This is one of the biggest floating-in jobs ever undertaken and was made hazardous by the risk of a storm arising before the span was safely landed on its piers. A period of suitable tides had to be selected for the work and arrangements made with the Meteorological Department to get the best possible advice on weather forecasts. The huge steel girders of the span, which themselves stand 80 ft. high, were first erected on top of span 6 at the south end of the bridge. Part of span 6 was then detached to act as temporary staging and four pontoons were floated in beneath it. On the rising tide, assisted by pumping out water ballast, the pontoons lifted the span clear of its supports, and with this impressive load were towed out to the gap between piers 2 and 3 where the span had to be landed. Unexpected high winds then arose and an interval of two days was occupied by mooring the span on its pontoons and maintaining it in position with the aid of tugs opposite the opening. This period of waiting was ended on Monday, December 1, when ideal weather conditions coincided with the last suitable tides and the girders were acurately located some 18 in. above the top of their supports on the piers.

The Minister and the Commission

THE Minister of Transport, Mr. Harold Watkinson, dealt with the trials and tribulations of the British Transport Commission when addressing a joint meeting of the Conservative back-benchers' finance and transport committees in the House of Commons this week prior to the debate on the Transport (Borrowing Powers) Bill, which took place after we had gone to press. There had been rumours of drastic proposals regarding the Commission's future. One Sunday newspaper had gone so far as to banner-headline its front page, foreshadowing demands for the return to private enterprise of such activities as hotels and refreshment rooms, and even passenger services, as if the last-named could be divorced from general railway working. Of course, everyone knows how to run a railway, but it is surprising that responsible people should still think that hotels, dining-cars and refreshment rooms would be better administered in private hands after the immense improvements that have in fact been made since nationalisation. However, the Minister did not have much trouble in bringing these starry-eyed idealists down to earth by explaining the practical difficulties and problems confronting the Commission. Following recent statements by Sir Brian Robertson and certain of his colleagues, published in the technical and lay Press, these should by now be common knowledge. As the Minister explained, they are accentuated by the unexpected fall in bulk traffics because of a slowing down of industrial activity generally, especially in the coal and steel industries. He emphasised that the Commission had been thoroughly impressed with the need for energetic and ruthless economies. Unfortunately efforts to secure these must frequently run the gauntlet of public objection through the complicated and prolonged procedure of the transport users' consultative committees—a fact critics often overlook.

Support for the Railways

APPRECIATION of the support given to the railways by the various bodies of enthusiasts was given by Mr. R. F. Hanks, chairman of the Western Area Board, when speaking at the recent annual dinner of the Railway Club, where he was the principal guest. While railway affairs were going through their present critical phase, he said, there was a greater need than ever for the moral and practical support of the railway societies. The railways were suffering from the cold blast of recession and in addition millions of pounds' worth of traffic was on the roads when it should be railborne. There were heavy shackles on the railways, laid on in days when they had a near-monopoly and when they were a universal transport medium. The present sad exercise of cutting down certain facilities should be well worth while in the long run. The railways accepted the challenge of the roads and could provide an efficient and economical means of transporting traffics to which they were best suited. Turning to matters of special interest to enthusiasts, Mr. Hanks mentioned the possibilities of a series of regional railway museums and of the Western Region's intended celebration next May of the centenary of the Royal Albert Bridge, Saltash.

Forthright Findings

PUBLISHED on Tuesday, the report of the Court of Inquiry into the recent dispute at London Airport involving the engineering maintenance staff of the British Overseas Airways Corporation manages to deal both sides some hard blows. One of its most satisfactory features is that it does not hesitate to describe much of the evidence given by an M.P., Mr. Ian Mikardo, as "mischievous." The employers' side is criticised for weakness in handling cases in the past and also for putting forward during the dispute, instead of afterwards, proposals designed to limit the activities of shop stewards. More might have been done to make clear the reasons for delays in negotiating the wage claim, although such delay in no way justified the imposition of a ban on overtime by the employees. There were some grounds for the complaint that employers' representatives had insufficient power to negotiate without reference to higher authority and it was unfortunate that the chairmen of B.O.A.C. and B.E.A. stood aloof from discussions at a critical time. There is good ground for the view that Mr. S. Maitland was the dominant figure in the B.O.A.C. joint shop stewards committee and that he followed Communist practice in indulging in disruptive practices. Local workers representatives and certain national union officials lacked either the strength or the will to restrain shop stewards from the unconstitutional ban on overtime. It is suggested that there should be a new agreement on redundancy to ease workers' fears. The rank and file should take the greatest care to find suitable shop stewards and the power of the latter and their committees should be more clearly defined and circumscribed. It is particularly imperative to re-establish the authority of the National Joint Council.

LEADING FEATURES IN THIS ISSUE

Portrait PAGE

Mr. F. P. Arnold, M.Inst.T. 11

Special Articles

Wages in Transport 2
Central Manchester Bus Station: Piccadilly Island Platform Completed 3
P.S.V. Developments in Germany .. 5
Aluminium Afloat: Cargo Lighters and Hatch Boards 8
National Investment in Railway Modernisation 9
M. and G.N. Area: Transport Reorganisation 11
Experience of Three Scandinavian Lines with Palletised Cargo .. 12
C.A.V. DPA Pump Widens Diesel Scope: 2—Governing and Performance 13
Boden Semi-Trailer with Cary Laminaire Suspension 14
Revolution in Handling of Rail Freight Traffic 15
Tractors at the Smithfield 17
Unusual Railway Tank Wagons for Mineral and Edible Oils 18

Modern Airways Section

The Aeroplane: Its Origin, Development and Possibilities 7

Regular Features

Book Notices 9
Commercial Aviation 11
Financial Results 20
Forthcoming Events 2
Important Contracts 20
Letters to the Editor 8
Lorry, Bus and Coach News 4
News from All Quarters 10
Publications Received 11
Shipping and Shipbuilding 20
Social and Personal 19
Tenders Invited 20

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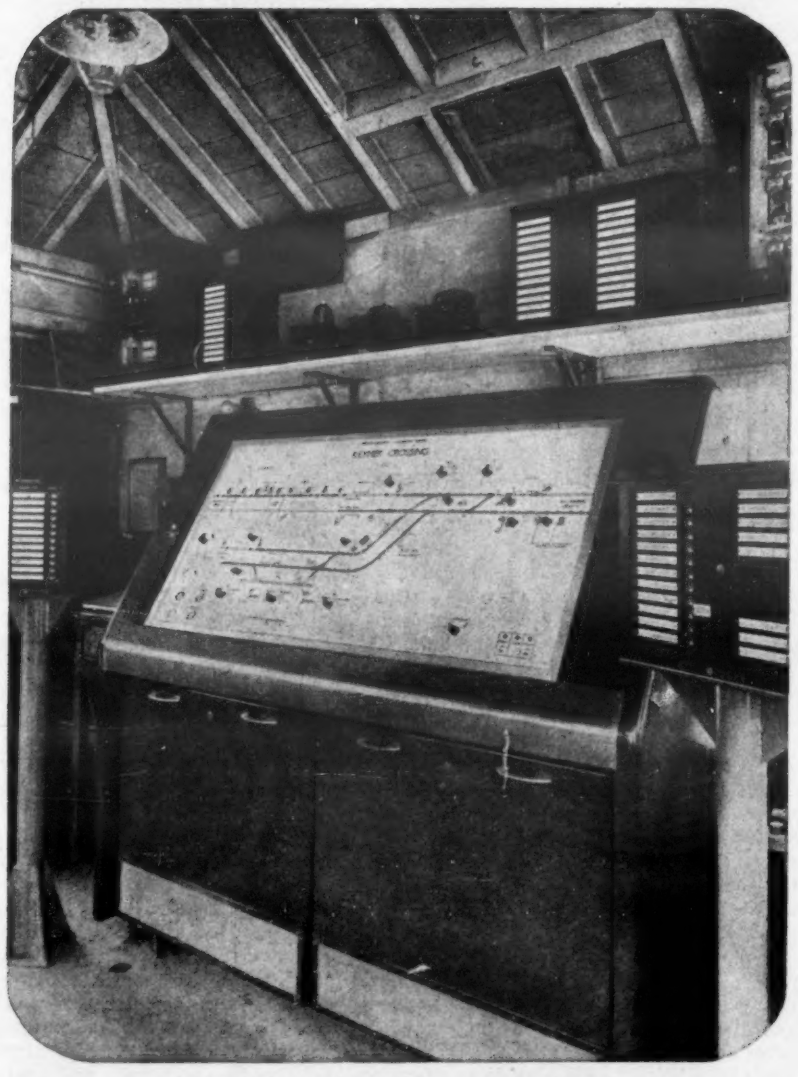

Photo by courtesy of British Railways, Southern Region

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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements.

Wages in Transport

THE transport industry, more perhaps than any other industry, is hag-ridden by the unceasing demand for higher wages, which indeed is at the root of the problem of inflation. The peculiar difficulties in this respect of the providers of passenger transport are fairly generally known but frequently ignored by those who prepare and produce wages demands, and not always appreciated by arbitration tribunals. As Mr. E. R. L. Fitzpayne pointed out in the Spurrier Memorial Lecture delivered to the Institute of Transport on Monday last, wages in passenger transport represent an exceedingly high proportion of its total costs, and it is an industry in which it is impossible to employ in any fair degree the techniques of mechanisation or automation. Moreover, competition is diverse and increasing, and itself produces the congestion which further enhances operating costs. The public is more critical of higher fares than of higher prices in almost all other directions and, despite all this, empty seat-miles are a dead loss because they cannot be stored, as can other commodities, for sale at a later date. Such is the problem of wages which was the subject of the lecture and the solution of which must depend mainly upon a change in the attitude and outlook of the trade unions. The author, in an understandable effort to skirt politics (he is the general manager of Glasgow Corporation Transport), ventured on few suggestions, but his review of management-employee relationships on both railways and roads was enlightening and provides a useful and up-to-date compendium on the subject.

Conciliation and Arbitration

CONCILIATION and arbitration have for long been means of settling industrial disputes and, although working "sometimes creakily," generally attain their object of industrial peace. Mr. Fitzpayne refers to but does not say he endorses the view that in the absence of a national wages policy thought should be given to streamlining the arbitration machinery and basing it on the present Industrial Court. The latter was established by the Industrial Courts Acts of 1919; it is an independent tribunal and is neither influenced nor controlled in any way by Government. Its findings are not binding, but the author cannot visualise their non-acceptance by any joint industrial council. Then there is the Industrial Disputes Tribunal, successor to the National Arbitration Tribunal set up in 1939, to which disputes can be compulsorily referred by the Minister of Labour; this body the Government has recently decided to abolish (mistakenly, many believe) on the ground that "it is out of keeping with British industrial institutions to enforce a system of settlements in which one party or the other has to be coerced by law." In this connection attention has been drawn to the danger of terminating the "issues" procedure whereby the Industrial Disputes Order could enforce voluntary agreement on all employers in an industry without subjecting it to the necessity of a statutory wages council. The author points to the heavy responsibility resting upon the arbitration courts in that their decisions can have far-reaching repercussions on the whole economy of the country and thus cruelly affect millions of people who are not protected by powerful trade unions. The interests of the third party to arbitration—the general public—are frequently overlooked.

A Debatable Dictum

IS this defect fully recognised by the arbitrators? There is no means of telling because the grounds for their decisions are not revealed in their findings. Courts of inquiry form an alternative to arbitration. One of the most remarkable was that presided over by Lord Cameron to inquire into the railway dispute in January, 1955. This court was responsible for the highly debatable dictum:

> The nation has provided by statute that there should be a nationalised system of railway transport which must therefore be regarded as a public utility of the first importance. Having willed the end, the nation must will the means.

This, as the author points out, lends itself to the dangerous interpretation that wages in all public utility undertakings should have no regard to the ability to meet expenditure, leading to the indefensible theory that a large sector of the economy should be supported by subsidised wages. Coupled with this is the equally strange argument that because buses provide a social service they should be operated whether or not they are remunerative, which ignores the fact that losses must in the end fall on the ratepayer or taxpayer. Successive governments have been chary of putting a brake on wages. In the last war price controls were used to counteract the effects of inflationary finance, maximum prices were fixed, demand was restricted by rationing, and subsidies were applied to keep down the cost of living. It was hoped that subsidies would avoid wage increases. But this they failed to do.

The Appeal for Moderation

THE Government White Paper of July, 1941, was the first in a long line of appeals for moderation in wages demands, all of which, with one exception, have been ignored. Mr. Fitzpayne says:

> We know now that wages continued to rise with the cost of living and that the suggestions made in the White Paper to stabilise wages were completely ignored. The first annual meeting of the Trades Union Congress after the publication of the White Paper was in September, 1942, and one can search the proceedings in vain for any reference to wage stabilisation. If this was the attitude of organised labour when the country was at war and a coalition government was in power, how can one expect any different outlook under the easier conditions of today?

How indeed? Since the war the unions, on the ground that it would hinder the carrying out of their prime functions, have strenuously opposed establishment by government of a national wages policy; but this may well have to be adopted failing a definite halt to wages demands which, if pursued, must lead to inflation and unemployment. Further appeals to reason were contained in the White Papers of 1947 and 1948 enunciating principles which, if they had been carried out, might well have saved the country the devaluation of the pound in 1949. The wage freeze policy of 1950 (introduced by a Labour Government) was the exception that received T.U.C. endorsement, but it got scant approval by individual unions. "One is entitled to ask," remarks Mr. Fitzpayne, "how unselfish workers and employers can be when these crises arise and reluctantly come to the conclusion that self-interest is usually paramount."

No Restraint

IT was in 1951 that to avoid strike action on the railways the Government stepped in and agreed with the demands of the unions, in spite of the advice of the court of inquiry and of the stand which the Railway Executive was prepared to make. The author attributes the final abandonment of wage restraint to the increase of 7½ per cent granted on that occasion. The play of politics was also seen in May, 1952, when the Government intervened to suspend increases in railway fares which had been sanctioned by the Transport Tribunal. Recent events on the wages front are fresh in the memory. Despite repeated Government appeal the unions pursue their course regardless of ultimate consequences. There is still no evidence that inflation through wage increases has been halted. There is as yet no national wages policy aimed at securing that workers in the non-productive industries such as transport should share in the benefits of increased prosperity in the productive industries. On the contrary, while uttering pious platitudes, the Government pursues its policy of non-interference with the normal processes of collective bargaining and arbitration and continues to refuse to control wage or profit levels. The latest appeal for moderation was made by the Chancellor of the Exchequer during the debate on the Queen's Speech in the House of Commons last month. But everyone, as Mr. Fitzpayne says, must know by now how hopeless such appeals are so long as employers and arbitration courts are willing to stave off industrial trouble by annual increments. In due course, as he suggests, it may fall to the road passenger industry to call a halt and, in the face of strike action, to refuse to pay higher wages because of the impossibility of meeting the cost.

Forthcoming Events

December 15.—Institute of Transport. Annual general meeting of corporate members. At 80 Portland Place, W.1. 5.45 p.m.
Institute of Transport (Sussex). Paper by Mr. F. E. Bell, "Trade Unions and the Railway Modernisation Plan." At Arlington Hotel, Brighton. 6.30 p.m.
Permanent Way Institution. Paper by Mr. G. D. S. Alley, "Track Recording Coaches." At 222 Marylebone Road, N.W.1. 6.30 p.m.

December 16.—Institute of Transport (Humberside). Paper by Mr. M. R. Haddock, "Dock Labour Scheme." At Samman House, Bowlalley Lane, Hull. 7.30 p.m.
Institute of Transport (Scottish). Paper by Mr. R. R. Murray, "Marine Insurance." At North British Hotel, Edinburgh. 6 p.m.
Institute of Transport (West Middlesex). Paper by Mr. F. G. Maxwell, "Underground Railways in North West Europe." At Control Tower Building, London Airport. 5.45 for 6.15 p.m.
Institution of Electrical Engineers (Measurement and Control). Discussion opened by Mr. W. J. Webb, "Modern Control Techniques on the Railways." At Savoy Place, W.C.2. 5.30 p.m.
Railway Correspondence and Travel Society (West Midlands). Paper by Mr. J. Harrison, "The Railways of Scandinavia." At 64 Holyhead Road, Coventry. 7.30 p.m.

December 17.—Institution of Electrical Engineers (Supply). Paper by Mr. E. P. G. Thornton and Mr. D. H. Booth, "The Design and Performance of the Gas-Filled Cable System." At Savoy Place, W.C.2. 5.30 p.m.
Motor Industry Research Association. Luncheon. At Dorchester Hotel, London, W.1. 12.30 for 1 p.m.
Railway Students' Association. Paper by Mr. G. H. Hinds, "Computors and Railways." At London School of Economics, Houghton Street, W.C.2. 6.15 p.m.

December 18.—Institute of Road Transport Engineers (Metropolitan). Paper by Mr. J. F. Moon, "Transport Developments in U.S.A." At Royal Society of Arts, John Adam Street, W.C.2. 6.30 p.m.
Institution of Locomotive Engineers. Annual dinner and dance. At Dorchester Hotel, London, W.1. 7.15 for 7.50 p.m.
Institution of Railway Signal Engineers. Paper by Mr. H. A. Codd, "Geographical Circuit Technique." At Institution of Electrical Engineers, Savoy Place, W.C.2. 6 p.m.
Diesel Engineers and Users' Association. Paper by Mr. L. D. E. Brodie, "Modern Trends in High Speed Diesel Engines." At Institute of Marine Engineers, 76 Mark Lane, E.C.3. 2.30 p.m.

December 19.—Institute of Navigation. Paper by Captain G. S. Ritchie and Captain A. J. R. Tyrrell, "The Admiralty Chart." At Royal Geographical Society, 1 Kensington Gore, S.W.7. 5.15 p.m.
Railway Correspondence and Travel Society (Lancs and North West). Paper by Mr. C. Smith, "Impressions of Swiss Railways." At D.O.S. Conference Room, Preston Station. 7 p.m.

CENTRAL MANCHESTER BUS STATION

Piccadilly Island Platform Completed

NOTABLE ALUMINIUM AND GLASS STRUCTURE

ON Thursday last week there was an official opening, by Councillor C. Blackwell, chairman of Manchester Corporation Transport Committee, of the reconstructed Piccadilly bus station, principal terminus of Manchester Corporation buses and used also by those of adjoining undertakings. The new bus station, which strictly speaking is in Parker Street, replaces earlier structures on substantially the same site. It is wholly of aluminium alloy and glass, and provides complete cover for waiting passengers, also certain other facilities, including an office and staff canteen. Several bus and trolleybus routes continue to terminate at, or to use in passing, stands adjoining the east and west end of the new terminal platform. Work started in February this year and the shelter was opened in sections from that time until completion last month. The shelters in George Street, which were completed at an early stage, are of concrete and glass.

The new Piccadilly island bus station in Manchester at a quiet moment. The actual thoroughfare seen here is Parker Street, now part of a gyratory traffic system

Development of new housing estates, principally to the south of the city, has greatly increased the number of buses required for everyday movement of passengers to and from offices and workplaces in the business centre and of latter years Parker Street has been strained to capacity, stands having to be found for more and more departures during the evening peak in particular. At one time 330 buses were scheduled during the evening, but only 223 from the station itself. The situation was eased in February this year when a station was brought into use nearby in Chorlton Street, off Portland Street. This is used by some 15 routes, mainly limited stop services to destinations including Stockport, Bramhall, Macclesfield, Altrincham, Northwich and Warrington, operated by the North Western Road Car Co., Limited, or jointly with that company and Stockport Corporation Transport. It handles 70 buses during the peak period.

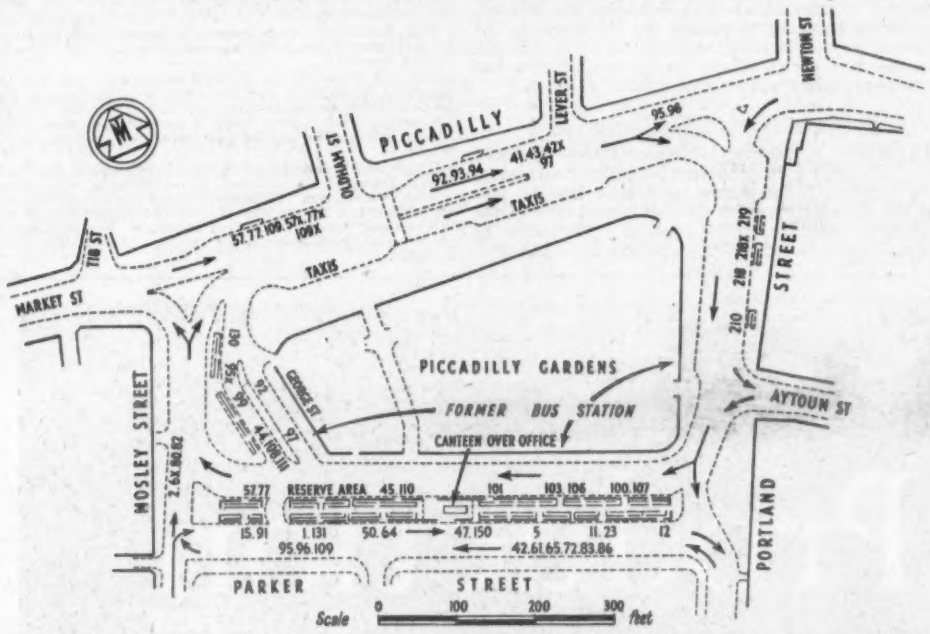

Diagram of the Piccadilly—Parker Street layout indicating route numbers (those over 200 are for trolleybuses)

Gyratory Traffic System

Chorlton Street station was necessitated by the decision, implemented in March, to introduce a gyratory system in the area of Piccadilly, using Parker Street as the east-to-west base. Provision was made in the scheme for a new bus passenger shelter on a central island in Parker Street, with every intending passenger under additional shelters already referred to, at the east and west ends of Parker Street. Between 5 p.m. and 6 p.m. on weekdays some 10,000 passengers are estimated to board 165 buses from the main shelter and 95 from the adjacent George Street shelters. There are about 1,600 departures daily from the main island platform. It is intended to instal traffic lights at one or more places in order to facilitate access to this island.

To direct passengers to the routes required illuminated lettered signs are suspended at barrier entrances and at vantage points inside the shelter notices key these letters to the appropriate routes, also showing departure times in abbreviated form. Route numbers, districts served, and any minimum fare or loading restrictions (i.e. on limited stop services) are indicated at the barrier entrances. These route numbers are displayed in external illuminated indicators also; at 11 p.m. they are switched out automatically and the 14 night route numbers are illuminated in their place. A further feature of the loading arrangements is a series of

(*Continued on page 18*)

The 12 ft. wide centre aisle in the new bus shelter, with queue barriers to either side

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(If I'm to make the extra bob)

To rush about an awful lot

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DIESEL-ELECTRIC LOCOMOTIVES
FOR MAIN LINE SERVICE

As part of their far-reaching modernisation plans, British Transport Commission called upon BTH to supply ten 800-h.p. diesel-electric locomotives for main-line freight duty. The illustration shows the first of these locomotives on test.

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LORRY—BUS—COACH

Fair-Play-for-Haulage Call

AN impartial public inquiry—outside the field of politics—should examine the functions of both road and rail on the basis of fair competition and having in mind the inevitable growth of road transport and the equally inevitable contraction of the railways. This proposal was made by Mr. R. N. Ingram, national chairman of the Road Haulage Association, at the annual dinner of its North Western (Eastern) area at Blackpool, on December 6. Mr. Ingram said: "It is the earnest desire of the road haulage industry that the railways should be made to pay their way and operate on a commercial basis. The poverty of the railways is sometimes put forward as an excuse for failing to relieve road transport of the monstrous burden of taxation at present imposed upon it. The taxation upon road users is currently running at the fantastic sum of £500 million per annum in fuel tax, excise duty, and purchase tax on vehicles. As an ordinary taxpayer the haulier makes his contribution to the subsidies given to his competitor the railway, while he himself is burdened with the special taxation to which I have referred. He has to pay his way and if he fails to do so he has no fairy godmother to whom to appeal; he will go to the wall."

He questioned whether drastic reductions in rail rates for goods traffic, reported by members, sometimes by as much as 30 per cent, were fair against a background of mounting deficits and "subsidy by the taxpayer." If a rail system was indispensable—and he still believed it was—it was high time for the impartial public inquiry. The Socialists, in their threat to renationalise long distance road haulage, were bereft of any sound argument by which to justify their policy. It was patently absurd to suggest that the operations of the 20,000 long-distance vehicles sold back to free enterprise could, if they were again absorbed by the state, result in any marked improvement in an organisation the losses of which were this year running at a rate of £85 million per annum.

New Glasgow Bus

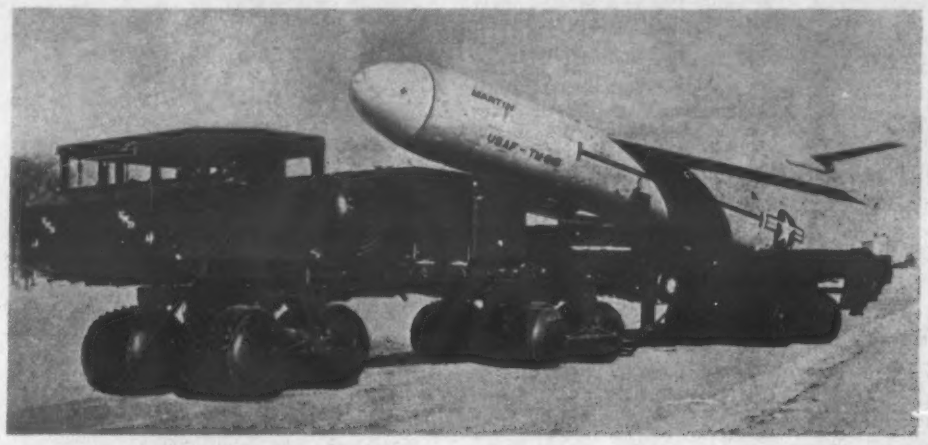
THE Leyland Atlantean 78-seat rear-engined bus, which was exhibited at the Commercial Motor Show, was delivered to Glasgow Corporation on December 1. It seats eight more passengers than the latest trolleybus or tramcar. Only one of these vehicles has been ordered but if it proves satisfactory the large carrying capacity may be a major factor in the further conversion from trams to buses in Glasgow.

Fatal Mistake in Coach Application

ONLY during the hearing of an application by the Yorkshire area Traffic Commissioners for an express coach service and excursions between Sheffield and London Airport did it transpire that most B.E.A. flights to the Channel Islands (a favourite venue for Sheffield holidaymakers) are now from Gatwick Airport. On this account the Minister of Transport has on appeal upheld the decision of the Commissioners not to grant the express licence to E. H. Sims, Limited. Since the applicant had not objected to the grant of a similar excursion to another Sheffield operator the refusal to Sims of a day excursion (also a weekend excursion to London, London Airport and Windsor) is also upheld.

Six-Month Revocation Period

ONE vehicle of Mr. Harry B. S. Lawson, a haulage contractor of Broughty Ferry, was ordered to be suspended from his licence for a period of six months by Mr. Alex Robertson, the Scottish area deputy licensing authority, at a sitting in Dundee. This was a penalty for irregular operation imposed in the course of two applications by Lawson. He was granted a 15-ton capacity oil tanker for the delivery of oil for storage within central Scotland. In the second application, in which he sought to have a normal user of general goods, central Scotland, for two vehicles, Mr. Robertson said he was satisfied that these two vehicles, with a limited normal user, had for at least 18 months or two years been regularly employed outside the declared normal user. The applicant pleaded that he did not know he was operating irregularly, but the licensing authority said he was not convinced. Nevertheless, he would give applicant the benefit of the doubt and grant the application. He must however punish him for these grave indiscretions and one vehicle would be suspended for six months as from December 1.



An F.W.D. Teracruzer with Translauncher semi-trailer is employed by the U.S. Air Force to carry its Mace surface-to-surface missile over any kind of terrain. Goodyear pillow tyres make this possible. The tractor drives through all eight wheels

P.M.T. Acquisition

IT was announced this week that the Potteries Motor Traction Co., Limited, has acquired the business of Baxter (Hanley), Limited. The Baxter business was founded in 1922 by the late Mr. J. T. Baxter, and became a limited company in 1928. Mr. J. T. Baxter was chairman until his death in December 1955, when he was succeeded by his eldest son, Mr. J. W. Baxter. The company owns 14 buses and coaches, and operates on the "Main Route" through the Potteries and on the route between Sandon Road, Longton, Victoria Road, Hanley and Chell. It also operates excursions and tours and private hire. For the time being Baxter will operate as a subsidiary of P.M.T.

Cost of Bus Station Superintendence

SIX bus operators were represented at a public inquiry at Newcastle upon Tyne into a dispute with Consett Urban Council concerning its bus station in the town. It was submitted that instead of the charges for using the station being raised as proposed, there should be a substantial reduction. The bus companies are objecting to the raising of bus station charges from 1s. per bus to 1s. 4½d. Colonel H. L. Swinburne, for the council, said the extra money was needed to cover increased costs, including wages. Mr. T. H. Campbell Wardlaw, representing one of the bus companies, said the post of bus station superintendent at £720 a year was unnecessary. He pointed out that two larger bus stations at Newcastle did not have superintendents. Mr. J. Quinn, Clerk to Consett Council, said that the superintendent's duties were to protect the council's interests as landlord, prevent wilful damage, to keep an eye on public safety, and to check the running of the buses. Mr. Wardlaw said the council was entitled to appoint a superintendent if it wanted to, but the operators objected to paying for his services. At Newcastle Corporation stations, the charge was 1s. per bus per day, and he claimed that a fair rate for Consett bus station would be 5d.

Sheffield Not to Run Into Debt

DURING a meeting of Sheffield City Council, Councillor H. Robinson, deputy chairman of the Transport Committee, said they had to face at the moment the most difficult period of Sheffield transport history in the change from trams to buses, and difficulties would mount up until 1961. Alderman J. W. Sterland said the deficit was entirely on trams, which did not run to new estates. Last year, moreover, there was a £79,000 carry-forward. Alderman S. Dyson, chairman of the committee, remarked that economies amounting to £23,000 had been introduced without the public being aware of them. Capital indebtedness had grown and in the accounts there was proper provision to pay off capital debts. They had made up their minds that when the trams went off the road they should be completely debt-free, and that was being provided for. The department was sound and had balances today considerably bigger than for many years. The department has ordered 45 Leyland Atlantean 73-seat buses and these should reduce the number of buses needed.

New Radio Units for Bus Control

KEEPING abreast of modern developments in the use of controlling transport by means of radio, Liverpool Corporation Passenger Transport Department, one of the first municipal operators to experiment in this field, recently renewed its entire radio control network and replaced its three mobile patrol cars, which have given such sterling service over the last few years, by Morris 1000 Traveller cars. The new A.M. radio system has been installed by Pye Telecommunications, Limited, and is designed to operate on the 25-kilocycle channel, the main station and remote control being equipped with Ranger 15W PTC 723 transmitter-receivers and the eight mobile stations with Ranger 5W PTC 2102 units mounted in the rear of the vehicles.

Apartheid Issue Forced

IN defiance of a Government directive imposing total apartheid on local transport, Pietermaritzburg City Council has challenged the legality of the order. Appearing for the city council before the Road Transportation Board, Mr. Harcourt, Q.C., maintained that total apartheid was illegal. If the board sought to enforce it the city council would go to the Supreme Court. If the Supreme Court upheld the board's decision the municipality would give a month's notice to cease operating the public bus service. Apartheid in Pietermaritzburg would mean a loss of £48,000 a year. The South African Minister of Transport has stated that his department is considering legislation for next year which would empower local Road Transportation Boards to stipulate the race of drivers and conductors of private transport undertakings. Municipalities, he said, would have to obey the laws and apply apartheid on buses, whether they liked it or not. If they did not apply bus apartheid, their certificates could be withdrawn.

Bus and Coach Developments

L. W. Silcox (Pioneer Bus Service), Pembroke Dock, seeks the excursions and tours from Tenby of Grey Garages, Limited.

From December 7, Birmingham City Transport bus route 158, City—Garretts Green Lane, was renumbered 17 and extended to The Meadway.

The last tram on the Sheffield—Brightside route ran on Saturday, December 6, and buses took over on Sunday. Bus route 42 has been discontinued and two new routes, 111 and 113, are operated at peak hours. A part-day tram service continues between the city and Sheffield Lane Top via Savile Street.

British and Continental coach and air tours which the South Wales Transport Co., Limited, will operate in 1959 include several new features. There are five-day tours to Devon, and the Midlands, a six-day tour in Kent and the south coast and a new 12-day tour to Switzerland and Paris. Routes of several of the already-established tours in the Continent have been modified.

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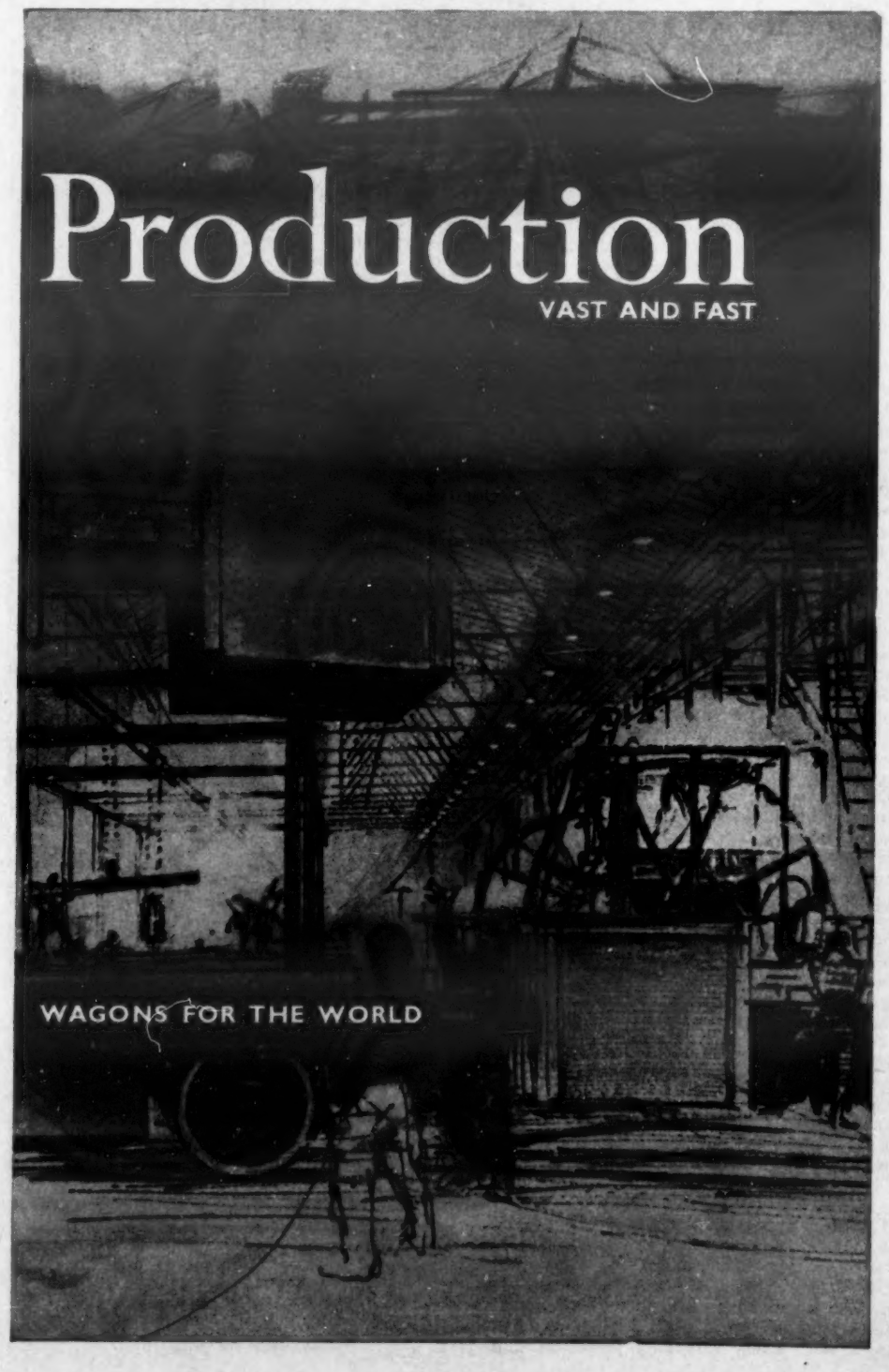

Pressed Steel

In the last ten years, Pressed Steel have produced enough railway wagons to make a train more than 300 miles long. Wagons of all kinds and all gauges for home and overseas. But sheer capacity—the ability to meet big orders and meet them quickly—is only half the story. The other half is just as important, even though it cannot be expressed in statistics—the finish, the painstaking attention to detail, the skill and experience of the men you see here.

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P.S.V. DEVELOPMENTS IN GERMANY

Bus Trailers to Disappear

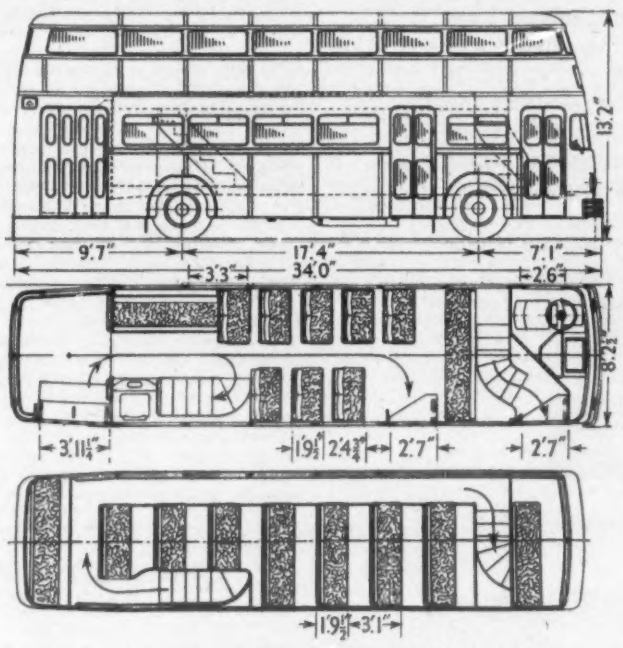
MORE DOUBLE-DECKERS IN SERVICE

AS in the prewar period the single-deck vehicle still provides the mainstay of German bus systems. There are signs that operators are now beginning to look to less orthodox types which can be introduced when new legislation, forbidding the use of passenger trailers, becomes effective on July 1, 1960. In spite of the reduced mobility of the bus-trailer outfits. The city of Wiesbaden, for example, uses over 20 articulated buses, each of which can carry 132 passengers (47 seats plus 85 standing). Overall length of these vehicles is 54 ft. and unladen weight 12 tons 17 cwt. The buses were built by Kässbohrer using Büssing T 6500 underfloor-engined chassis for the front section. A bus and trailer combination to carry the same load would be up to 10 ft. longer. Power-assisted steering is fitted to the "jointed" bus and steering linkage is arranged so that the wheels of the rear section follow the track of the front unit. Against the articulated bus is the increased difficulty in handling for routine servicing and maintenance which may require new or modified garage facilities. Furthermore a bus of these dimensions will of necessity be restricted to selected routes and duties whereas a conventional bus, after dropping its trailer when not required, is infinitely more flexible in its field of application.

Double-deck bus and trailer combination in Mönchen-Gladbach for 165 passengers; this p.a.y.e. outfit by Orenstein and Koppel has a gross weight of over 20 tons

outfit it has always been felt that the enhanced operating economy offset the disadvantages and, at the end of 1957, there were still 3,227 trailers of varying capacity in use. Of this total the post office and railway-operated bus services accounted for 752 and 630 trailers respectively.

It has already become clear that special dispensation will be granted in cases of hardship to enable the continued use of trailers on certain routes after the critical date, but nobody seems to know at present what is to become of the great number of other units which will become redundant. The German trailer building industry has for the past few years felt the effects of the impending change and has not found it easy to divert the manufacturing capacity to other outlets.



General arrangement of 100-passenger double-deck bus for p.a.y.e. operation in Mönchen-Gladbach

The passenger flow at intermediate stops for articulated units is of a better pattern than with the bus-trailer train where conflicting movements occur owing to separate boarding and alighting flows for the two vehicles. Invariably in an articulated vehicle the conductor is seated and an important feature of the p.a.y.e. system is the large reception space which allows passengers to board quickly and to stand clear of the platform doors to reduce delays at stops. Obviously the articulated bus scores on the point of crew economy, as it can shift the bus-and-trailer load with only one conductor.

From the operator's point of view it is fortunate that German statutory regulations governing the capacity of p.s.v.s are somewhat lenient so far as crush loads are concerned. In any case the passenger has never known the comfort of a British bus, although, to retain patronage which is liable to be claimed by the scooter, motor cycle or private car, more has been done in recent years to make bus travel attractive than ever before. In consequence there appear to be three main p.s.v. designs which have so far come under consideration as replacement types by undertakings which have up to now relied on the trailer to cope with peak loads.

P.A.Y.E. Double-Deckers

With simplified fare structures the application of the p.a.y.e. system is of course practicable for the large capacity vehicle and, almost concurrent with a change to a new system of fare collection, the town of Mönchen-Gladbach introduced a double-deck bus design incorporating many entirely novel features. Some years ago the operator had hired a double-deck bus from Berlin, the only German town where these vehicles are used in large numbers. The Berlin bus was then tried out on various routes in Mönchen-Gladbach to discover passenger reaction to this type of vehicle. Whilst reasonable results were obtained with regard to the loading and alighting routine at stops it was found that the conductors could not satisfactorily collect all fares when carrying a full passenger complement on both decks.

A request was accordingly made to Orenstein and Koppel, builders of the bus, to adapt the layout of the 34-ft. body to "passenger flow" and the p.a.y.e. method. This was achieved in an ingenious way by re-arranging the rear staircase to rise from

(*Continued on page 6*)

Interior views of 100-passenger p.a.y.e. double-decker showing conductor's desk under stairs; he is aided by glazed risers in the stairs for observing the lower deck and an electronic counting device for showing the occupation of the upper saloon

Articulated Buses

Buses of the articulated type were first introduced in Germany in 1953 and have become popular on stage and express services in various parts of the country. Articulated vehicles are also affected by the new law which restricts their overall length (after 1960) to 49 ft. 3 in. Here again is speculation as to the fate of the earlier units, most of which exceeded this dimension by six to nine feet. Sufficient operating experience has been gained to assess the suitability of the articulated bus for city or interurban routes.

The following comments illustrate the relative merits of units of this type over bus-and-trailer

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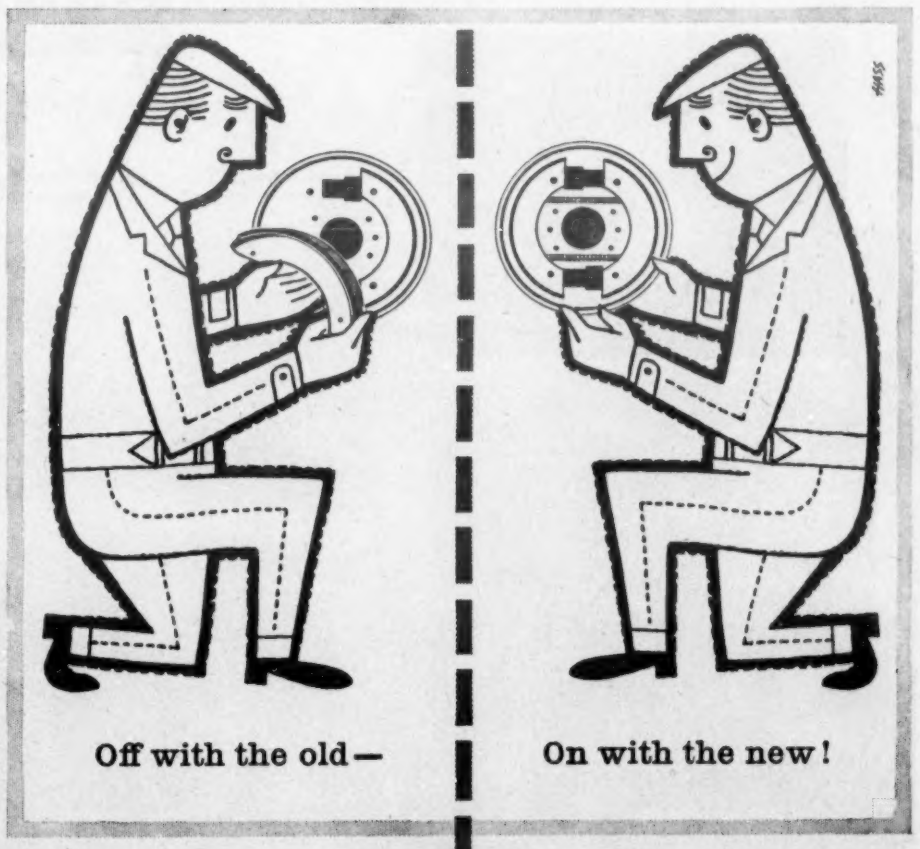

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P.S.V. Developments in Germany

(*Continued from page 5*)

inside the lower saloon; passengers reach it only after paying their fares to the seated conductor. The front exit for the lower deck has been placed behind the front axle and a second, "down only," staircase leads to a separate exit ahead of the front axle. An exceptionally large rear platform has resulted from the removal of the stairs. The platform is enclosed by power-operated doors and can hold up to 30 persons. The vehicle offers 60 seats (25 lower, 35 upper deck) and space for approximately 40 (!) standees. This compares with 70 seats and correspondingly less standing space in the Berlin bus from which the Mönchen-Gladbach vehicle was derived. Incidentally the number of standing passengers carried in a German p.s.v. is always subject to a further permissible overload during peak traffic hours of roughly 50 per cent and this factor also applies to the double-deck bus.

TYPICAL GERMAN LARGE-CAPACITY P.A.Y.E. BUSES:

	Bus and trailer	*Articulated bus (Wiesbaden)*	*Double-deck bus (M.-Gladbach)*	*1½-deck bus (Duisburg)*
Overall length	59 ft. 1 in.	54 ft.	34 ft. 1 in.	38 ft. 9 in.
Height	9 ft. 11 in.	10 ft. 2 in.	13 ft. 2 in.	12 ft. 2 in.
Weight	14 tons	12 tons 17 cwt.	9 tons 12 cwt.	7 tons 7 cwt.
Engine b.h.p. (all underfloor)	—	150	150	130
Wheelbase	—	*17 ft. 2½ in.	16 ft. 10 in.	15 ft. 11 in. †4 ft. 2 in.
Seats	65	47	60	50
Total passengers carried	140	132	100	120
Crew	3	2	2	2
Maximum permissible length after July, 1960	59 ft. (by special dispensation only)	49 ft. 3 in.	39 ft.	39 ft.

* Tractor section only. † Three-axle bus.

Double-Deck and Trailer

In addition, and this we believe is unique in bus operation, the double-decker hauls a 65-passenger single-deck trailer during the morning rush hour and again between 4 p.m. and 7 p.m. This method of operation over a 10-mile route can of course only continue until the introduction of the above-mentioned legislation. The 22-seat trailer built by FAKA, of Salzgitter, also has separate entrance and exit doors and a seated conductor. Weight of the bus in full working order is 9 tons 12 cwt., the trailer weighs 4 tons 9 cwt. and the gross train weight with maximum load lies well above 20 tons.

The Büssing six-cylinder underfloor oil engine develops 152 b.h.p. at 2,000 r.p.m. and drives the vehicle through a Voith Diwabus transmission. In a bus having the entrance and exit configuration described it is essential to give the immobile conductor a continuous indication of the number of passengers aboard the vehicle. This is provided by a number of photo-electric mounting devices which record passengers ascending to the upper saloon and again those who leave by the front exit. The differential counter presentation on the conductor's pay desk offers a constant check on the number of seats occupied and a tell-tale light gives visual warning as soon as 35 persons are on the upper deck.

Photo-Electric Door Control

Other refinements which are being applied to the production vehicles which Mönchen-Gladbach is now acquiring for its suburban routes include photo-electrically controlled door gear which relieves the conductor from operation of the two exit doors. The apparatus detects the number of passengers descending the stairs and closes the jackknife doors after a brief delay only when the last person has alighted. Various interlocks make it impossible to start the bus with the doors in the open position.

A solitary double-deck bus of similar design to the one described has recently appeared on a suburban route at Stuttgart. The main difference is in its permanent use as a one-man-operated vehicle. The front stairs have been removed whilst the rear-facing stairs to the upper saloon have remained in the same position as in the Mönchen-Gladbach type. There are 74 seats, equally divided between the two decks. A door amidships serves as exit.

Articulated bus in Bremen with Büssing units and Emmelmann body for up to 132 passengers; right, a Ludewig-Aero 1½-deck bus for 63 seated and 40 standing passengers used by the Hanover undertaking on a 19-mile limited stop route to Hildesheim. Powered by a Büssing 150-b.h.p. engine, unladen weight is 10 tons 11 cwt. It is designed for one-man operation and the driver collects all fares before leaving the Hanover terminus on outward trips

Space under the seats in the rear section where the drop frame extension normally carries the platform has been used to house tools and a spare wheel! Interest has now spread to Vienna, where before the 1914-18 war Daimler 34-seaters plied, under the auspices of the British Electric Traction group, and a German-built double-decker is again the subject of experiment in the Austrian capital.

The 1½-Decker

At the Frankfurt motor show in 1955 the firm of Ludewig exhibited a bus which possessed a larger number of seats than the conventional 39-ft. long single-deck vehicle and at the same time could carry a greater proportion of standees. The double-deck bus described above, although of pronounced lowbridge design, is in many cases still unsuitable for routes with low overbridges and the Ludewig 1½-deck Aerobus has had a very favourable reception on account of its overall height when unladen of only 12 ft. 2 in. Based on earlier experience gained in the construction of a number of 1½-deck observation type coaches, the Ludewig design has in the meantime been adopted to a number of prominent German operators. Buses (and trolley-buses) of this type are now in service in Aix-la-Chapelle, Düsseldorf, Essen, Hanover, Lipstadt, Osnabrück and Wuppertal, as well as in Duisburg where the prototype vehicle was introduced over three years ago and where nearly a score of similar units are now at work.

The basic layout provides a very large rear loading platform reached by a single 15½-in. step. The conductor's pay desk is situated at the entrance to the main saloon whence four 9-in. steps lead to the upper rear section above the platform. This section, where smoking is permitted, has 17 seats and a gangway height of 5 ft. 10 in. The total number of seats in the bus is 50 and between 60 and 80 standing passengers can be carried. Modified standard underfloor-engined chassis are the basis; the running gear is altered by the addition of a single trailing axle. With a Büssing 130-b.h.p. engine the weight has been kept down to about 7½ tons. Compared with a bus and trailer combination of similar capacity this represents a net saving in weight of 50 per cent.

Operating Results

Recent observations published by the Duisburg undertaking on the operating results obtained with these buses have expressed full satisfaction both from the engineering and traffic aspects. Road space per passenger carried is considerably reduced over that occupied by the ordinary single-decker. Boarding and alighting movements are accelerated by the provision of two separate exits, amidships and at the front. Drivers appreciate the excellent handling qualities of the bus which has power steering. Tyre wear on the trailing axle is less than that on a three-axle bus with two driven axles. Finally, and here may lie another reason for the reluctance in using true double-deckers, running characteristics and road holding of the 1½-deck bus on interurban roads with the heavy camber prevalent in Germany are far superior to those of the double-deck buses currently produced by the German industry.

Considering that the German designer has a remarkable amount of latitude, particularly in the way of weights and dimensions, it is surprising that no work has been done along the lines followed so successfully in the U.K. If a European market should one day result in 39-ft. long Atlanteans, Bridgemasters or Lolines appearing on German roads the transport industry there may find a solution to its problems.

when this bank moves a lot of 'Perspex' moves too

In this National Provincial Bank mobile office unit the lighting fittings, cornice lighting panels, windows, surrounds and signs are made from 'Perspex' acrylic sheet. This diversity of applications gives some idea of the versatility of 'Perspex'. It was chosen because it is a material with many outstanding features: it is attractive (and stays attractive), light in weight, strong and easily maintained. It is long lasting, and stands up well to all sorts of weather. The light transmission of 'Perspex' is high.

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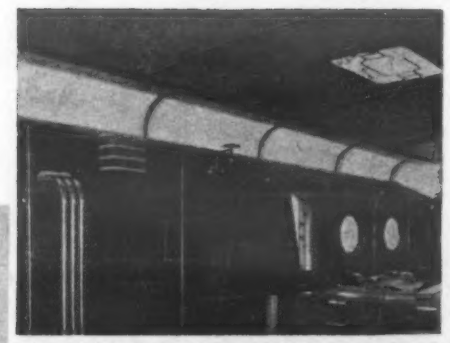

National Provincial Bank mobile office unit made by Coventry Steel Caravans Ltd. It has cornice lighting panels, lighting fittings, windows, surrounds and signs all made from 'Perspex' acrylic sheet.

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UPRATED PERKINS ENGINES

Industrial and Marine Diesels

NEW higher ratings have been introduced for industrial and marine diesel engines manufactured by F. Perkins, Limited, Peterborough. Engineering developments have made greater speeds possible and extensive test work has proved that these are well within the capabilities of individual power units. New maximum continuous and intermittent ratings are now possible in the case of industrial diesel engines. These will be offered at continuous operating speeds up to 2,000 r.p.m. for most types and 3,000 r.p.m. for the Four 99 1.6-litre engine. Intermittent ratings have been approved for speeds up to 2,400 r.p.m. for P Series and R6(I) engines and 3,600 r.p.m. for the Four 99(I) industrial diesel engine.

INDUSTRIAL ENGINE RATINGS

Engine type	*Swept volume cu. in.*	*New continuous rating*	*Old continuous rating*	*New intermittent rating*
Four 99(I)	99	34·8 at 3,000	32 at 3,000	42·3 at 3,600
P3-144(I)	144	32·7 at 2,000	28·25 at 1,800	41·5 at 2,400
P4(I)	192	43·6 at 2,000	37·5 at 1,800	55 at 2,400
L4(I)	269	53 at 1,800	53 at 1,800	—
P6(I)	288	65·4 at 2,000	57·5 at 1,800	83 at 2,400
R6 (I)	340	69 at 2,000	67 at 1,800	102 at 2,400
S6(I)	450	104 at 2,000	89 at 1,800	119 at 2,000

Although continuous ratings for Perkins marine engines remain unaltered, special maximum intermittent ratings have been introduced. These will make certain engines particularly suitable for fast planing craft.

MARINE ENGINE RATINGS

Engine type	*Swept volume cu in.*	*Continuous rating*	*New intermittent rating*
P3-144(M)	144	30 at 2,000	37 at 2,250
P4(M)	192	43 at 2,000	51 at 2,250
L4(M)	269	58 at 2,000	—
P6(M)	288	66 at 2,000	79 at 2,400
S6(M)	450	100 at 2,000	120 at 2,100

The National Benzole Co., Limited, announces the retirement of Mr. G. E. Roberts, manager of its Eastern division, at the end of October. He was succeeded by Mr. W. S. Westbrook.

After a survey of the potential market in South Africa for flexible tubing and hoses, a new company, Flexible Tubing Africa (Pty.), Limited, with a registered office at P.O. Box 11259, Johannesburg, has been formed primarily to handle Compoflex products and with the ultimate intention of setting up a South African manufacturing organisation for the Compoflex Co., Limited.

MODERN AIRWAYS and COMMERCIAL AVIATION SECTION

THE AEROPLANE

Its Origin, Development and Possibilities

THEME OF THREE CANTOR LECTURES

THE three Cantor Lectures of the Royal Society of Arts have this year been devoted to the subject of the aeroplane. The first, by Mr. C. H. Gibbs-Smith, dealt with its birth and reviewed the preparatory work in both Europe and North America which led to its practical development. It had been the decade of the 1890s which produced, quite suddenly, the first purposeful gathering together of research and endeavour, and the first successful piloted gliding flights. There had also emerged during those 10 years two vital and radically different viewpoints of what was involved in aviation.

One school, deriving its attitude of mind from the model-makers of the previous generation, looked upon the aeroplane chiefly as a lifeless machine to be designed, constructed and then made to work; the inventors regarded themselves as living outside the aircraft they created. As engines became more efficient, they set to building full-size aeroplanes on the same principles as the model-makers—especially aiming at inherent stability—which the pilot would then drive, much as a chauffeur would drive a car, or a seaman steer a ship. It was this attitude which retarded European aviation for so long, its most typical symptoms being an over-intentness upon inherent stability, the neglect of proper control and manoeuvrability in the air, and the inability of the designers to identify themselves with their machines.

Enterprise of Flying

The other school, although just as concerned with theory and research as its rival, saw itself as essentially a partaker in the enterprise of flying. It comprised, by and large, more humble men and therefore superior men for this job. They lived and worked as parts of their aircraft, thus co-operating and identifying themselves with the machines they made. While they had been preceeded by Otto Lilienthal, Percy Pilcher, Ferber and Chanute, the Wright brothers were the most successful in this school. They had, of course, been influenced by Chanute, although much of their success in achieving powered flight in an aeroplane was due to their own thought and ingenuity.

"It was on August 8, 1908, that the revelation was vouchsafed to us Europeans after our five years in the wilderness; five arid and inexplicable years, with the world's finest scientists, technologists and mechanics surrounding us to no helpful purpose. For on that day Wilbur Wright first flew in public, at the little Hunandières racecourse near Le Mans in France.

Belated Realisation

"Within days, the world of aviation realised that the secret had all along lain in manoeuvrability; within weeks, it realised that this manoeuvrability was a question of sensitive co-ordination of elevator, rudder and wing-warping, and that it was greatly aided by the inherent instability of the aircraft and the consequent necessity for the pilot actively to control it for every second of its flight; and within months, that what was needed for the average pilot of the future was a combination of the stability beloved of the Europeans, and a good measure of sensitivity to the controls. Photographs, diagrams and descriptions of the construction and rationals of the Wright *Flyer* were soon published throughout the world, and by mid-1909 every new aeroplane incorporated effective wing-warping or ailerons, and every pilot was realising the true nature of flying. European aviation was thus reborn in 1909, and soon came to lead the world, finding at last all the talent and courage it had needed for so long."

In the second lecture Mr. Peter W. Brooks dealt with the development of the aeroplane between 1908, when the Wrights gave their first public demonstration flights, and 1958. In 50 years, the aeroplane had progressed from the tentative experimental flying machines of 1908 to the highly developed military aircraft, air liners and light aeroplanes of today. Far as we had come, past trends suggested that the future would see even more remarkable progress. The aircraft of 50 years hence would no doubt differ as strikingly from those of today as these do from the first practical aeroplanes of 1908.

Comparison Over 50 Years

Comparing the main characteristics of the Wright biplane of 1908 with those of three modern American aircraft of widely differing types representative of best current design practice, the three types chosen were the Lockheed F-104A jet fighter, Boeing 707-120 jet transport and Cessna 310B light aeroplane. The comparison brought out very clearly the directions development had taken in 50 years. Perhaps the most striking advance was in maximum speed: instead of the 40 m.p.h. of the Wright *Flyer* and its contemporaries—about the average cruising speed of a modern family car—the modern light aeroplane cruised at a speed approaching 200 m.p.h., the commercial transport at about 85 per cent of the speed of sound, while the highest performance military aircraft could fly at more than double the speed of sound. A large part of this spectacular progress had taken place during only the past 12 years.

The two most important developments which had made these speed increases possible were reduction in drag—at the same time as structures had been enormously increased in strength—and growth in power, for low weight, offered for high-performance aircraft by the new turbine engines. The installed power in the large turbine-powered bombers and transports was of the order of 1,000 times greater than was available in the first practical aeroplanes.

Stalling-Speed

Trends in minimum flying speeds had been less satisfactory. None of the first generation aeroplanes had any practical speed range—they had to be flown the whole time just above the stall. This particular characteristic had since been remedied but the stall had still to be approached at every landing and flight at speeds near the safe minimum remain essential in normal operation. The minimum speed of 31 m.p.h. of the Wright *Flyer* had risen to 60-80 m.p.h. for modern light aeroplanes and to speeds of 90-130 m.p.h. for transports and military aircraft. Some of the latter now had stalling speeds as high as 150 m.p.h. These increases in minimum speeds had been associated with remarkable changes in ground facilities. Whereas the Wright *Flyer* normally took-off from a simple wooden rail 160 feet long and could land on its skids on a few yards of level grass, the modern high-performance aeroplane—whether military or transport—required 10,000-ft. runways made of concrete two feet thick. Even light aeroplanes nowadays normally needed something like a 3,000-ft. field, preferably with hard surface runways.

Increases in lift coefficient had done something to mitigate the effect of the astonishing growth in wing loading which had taken place, particularly in the past 25 years. Wing loadings of a few pounds to the square foot were general in the pioneering days and such loadings were still used for sporting sailplanes and ultra-light aeroplanes. By the early 1930s, loadings of 10-15 lb. per sq. ft. had become normal for all types of aeroplanes by a process of gradual increase over the years. The flapped monoplanes of the mid-1930s raised the figure to 20-30 lb. per sq. ft. and, in the past 25 years, it had continued to increase rapidly for high-performance aircraft which might now have loadings as high as 100 or more. Light aeroplanes had remained at about the mid-1930 level.

Changes in configuration and developments in structural methods and materials had made the biggest contribution to perhaps the most significant of all the contrasts between 1908 and 1958. The growth in size and range of the aeroplane during this period had been even more remarkable than the advances in speed. That aeroplanes of 150 tons and more should today be carrying loads equivalent to 150 passengers 3,500 miles nonstop across the Atlantic at speeds of 550 m.p.h. was indeed a far cry from the faltering flight of those first flimsy aeroplanes of 50 years ago.

Research

Dealing with the future of the aeroplane in the third Cantor Lecture, Mr. Eric Mensforth pointed out that progress involves long-term pure research and short-term *ad hoc* work; programmes were concerned not only with supporting current designs but with looking a long time ahead. Present results were the basis for a new design concept which from inception to practical use might well take 10 years. The whole business was essentially competitive and the time scale was as important as the actual results: "better late than never" did not apply. There remained great scope for aeronautical research and it was still essential to national survival and industrial prosperity. The scale of effort in the past had been closely related to military needs. With many claimants upon limited national technical resources it might be that in the future a smaller proportion would be devoted to aeronautical affairs. This made the correct choice of objectives very important, involving, as they did, great skill and the taking of risks; particularly in the United Kingdom there must be a high degree of specialisation.

With such great advances already made was there a prospect of rapidly diminishing returns? Probably not; even without big increases of speed, altitude or load, there were worthwhile prizes to be won, e.g. relating to operating costs, to all-weather reliability, to avoidance of long runways, to overall time saving and to noise reduction, which would justify great effort.

Aerodynamics

"Aerodynamic theory has until recently assumed two-dimensional flow and a rigid flight structure. With supersonic aircraft employing slender shapes with wing aspect ratios of unity or less, air flow must be treated as three-dimensional. The success of the present generation of British aircraft has been achieved with insufficient aerodynamic research equipment. Now, however, fine new equipment has been provided at the government establishments and in private industry: some indication of what is involved is that the new supersonic, Mach 2.5, wind tunnel at Bedford requires 80,000 h.p.

"The compressed air readily available from jet engines will be used to improve aerodynamic characteristics. The power plant will then be employed for both propulsion and lifting. By sucking over large areas laminar flow is maintained, thus greatly reducing drag; by blowing along the wing trailing edge a jet flap is produced giving much larger wing lift coefficients than those possible with conventional flaps, thus reducing landing speeds. Many problems arise in supersonic flight affecting stability and control e.g. a divergence in yaw or pitch at a particular state of roll and reduction, and possible loss of directional stability as Mach number increases. In hypersonic flight actual dissociation of the air in the flight path may occur.

"It appears, and this is reflected by present operating trends, that the best profit margin to the airline operator will occur immediately with the following aircraft, assuming similar sizes: for no runway restriction on take-off, the turbo jet flying at about 45,000 ft. and 600 m.p.h. cruising speed, over a range from 1,000 to 5,000 miles; for a runway restriction of say 3,000 ft. on take-off the turboprop aircraft at approximately 35,000 ft. and 450 m.p.h. cruising over similar ranges. The validity of this conclusion can be affected by timing. The Vickers Viscount and Rolls-Royce Dart combination arrived exactly at the time when new short-to-medium-range air liners were wanted. The long-range turboprop has, however, overlapped with the jet liners to disturb the normal sequence of development; in spite of the certain economy of the turboprops, they may face difficulty in establishing themselves because of politics and the settled habits of airline operators in consistently seeking more speed.

Supersonic Air Liners

"Supersonic air liners already planned should achieve operating costs comparable with present-day levels. The choice of cruising speed is open: the lowest speed would be 800 m.p.h. (Mach 1.2) when ideally the aircraft would have subsonic flow over the wing, probably over the tail and fin, thus delaying the onset of transonic drag rise. Having achieved this, however, the aircraft would be sen-

(*Continued on page 8*)

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ALUMINIUM AFLOAT

Cargo Lighters: Hatch Boards

ALUMINIUM as a constructional material has rapidly been gaining in popularity in the field of ship construction. Typical of the work now being undertaken by Saunders-Roe (Anglesey), Limited, in this connection are the all-welded aluminium alloy hatch boards supplied recently by the company for the m.v. *Enugu Palm*, of the Palm Line, Limited, to the order of Swan Hunter and Wigham Richardson, Limited, builder of the vessel. The design of these boards has received Lloyds Register of Shipping and Ministry of Transport approval for length of up to 6 ft., which compares with a maximum length for normal timber boards of 5 ft., or 10 ft. with an intermediate support. Tests are now being carried out on an 8-ft. board of similar design for use without intermediate support, and it is hoped to be able to offer this increased length in the near future.

The dimensions of the boards supplied to the *Enugu Palm* vary in length and width according to hatch dimensions supplied by the shipbuilder. On an average, however, the boards have an overall length of 5 ft. 6 in. and a width of 1 ft. 6 in., each board being supplied as a watertight fabrication with a positive buoyancy. Their average weight is only 43 lb., roughly one-third of the weight of a standard wet timber board, which enables them to be lifted and carried easily by one man. This, combined with the smooth surfaces of the boards means that they can be easily slid into position across the hatches. The all-welded nature of the fabrication also eliminates any possibility of crevice corrosion which sometimes occurs in riveted seams.

One of two ramped cargo lighters of light alloy construction for the Royal Pakistan Navy; right, aluminium hatch boards referred to in the text

Performance Under Test

In spite of their light weight, rigorous tests carried out by the Northern Aluminium Co., Limited, designer of the prototype boards, have proved that the method of construction enables the boards to withstand all the loads and rough handling which may be expected under service conditions. In these tests it was found that after applying an evenly distributed load of 8 cwt. per sq. ft. to the board, which was simply supported at each end, the mean permanent set was 0.04 in., while later tests showed that even after permanent set had occurred the board was still able to withstand a maximum sustained load of 16 cwt. per sq. ft.

Cargo Lighters

Recently completed were two 60-ft. ramped cargo lighters of all-aluminium riveted construction built for the Royal Pakistan Navy by Whittingham and Mitchel, Limited, Chertsey, Surrey. They are intended mainly for operation in shallow waterways, and the use of aluminium instead of steel has made possible considerable savings in draught. The deadweight capacity is 30 tons on a load draught of 3 ft., and the mean light draught is only 1 ft. The hull is generally of a simple box section with a watertight bulkhead at the forward end of the machinery space, and two continuous wing buoyancy tanks; these are bounded on the inboard side by the hold side plating, which extends vertically to form the deck coaming. The bottom is of open construction with timber hold ceiling.

The light-alloy materials were again supplied by Northern Aluminium. All plating in the hull is of $\frac{1}{16}$-in. Noral B54S alloy and all frames, beams, stiffeners, and connections to floors and keelsons of 2 in. by 2 in. by $\frac{3}{16}$ in. angle in Noral B51SWP alloy (HE1OWP).

Loading Ramp

Each craft is powered by two Perkins S6M marine diesel engines, rated at 75 b.h.p. at 1,500 r.p.m., with 2:1 reduction gearing, and with transmission through a stainless-steel propeller shaft to twin 27-in. diameter aluminium alloy propellers. Each propeller is protected by a projecting skeg on the cast aluminium propeller bracket, and deep timber rubbers are fitted both port and starboard, being separately supported by brackets at their after ends. A loading ramp is provided with timber tracks for vehicles, and is operated from aft by wires led along the deck coamings.

LETTERS TO THE EDITOR

Coach v. Train

The Editor is always glad to receive letters from readers on subjects germane to the transport industry, but these should be written as concisely as possible. The opinions expressed therein must not, however, be regarded as having editorial endorsement. Where correspondents desire to use a nom-de-plume it is essential that the Editor should be informed of the name and full address of the writer as indication of good faith.

SIR,—In your issue of December 6 you publish a letter from the chairman of the Passenger Vehicle Operators' Association under the heading "Coach v. Train."

In view of its abusive nature I do not propose to reply to the attack which it makes, but for the sake of the record I am asked to point out that Sir Reginald Wilson has never "come to the conclusion that it [the licensing system and/or the railways' attitude to it] has been the wrong policy." He said nothing at all on the point. Nor did he say some of the other things implied by your correspondent.

Incidentally, surely the chief objectors to the granting of road licences to newcomers are often the established road operators; and surely the railways do not run their long trains "in the hope" of getting passengers during a surge, but exactly because the surge has to be met—by someone.—

Yours faithfully,
J. H. BREBNER,
Public Relations Adviser,
British Transport Commission.

222 Marylebone Road, N.W.1.

The First Excursion

SIR,—May I suggest that there is a distinction between *excursion* trains and *special* trains, and I think the trains run by the Southampton Railway to the then Kingston (now Surbiton) station for Epsom, and probably the Bodmin venture, were almost certainly the latter (MODERN TRANSPORT, December 6).

The merit of having run the first *excursion* train—as generally accepted today—has always been authentically credited to Mr. Thomas Cook.—Yours faithfully,

J. P. BARDSLEY.

Withdean,
Brighton.

Facilities Through Harwich

SIR,—May I comment on No. 16 in your admirable series "Sea Links with the Continent," which is entitled "Facilities Through Harwich"? (MODERN TRANSPORT, November 15). The first point concerns the post-1945 survivors of the prewar L.N.E.R. fleet: the *Vienna*, sister ship of the *Prague* and *Amsterdam*, is in fact still in service between Harwich and the Hook on the B.A.O.R. leave service. Though completely transformed internally and no longer in her railway colours, there can be no mistaking her graceful outlines against Parkeston Quay and the Hook.

The second comment is that *Dewsbury*, on the Antwerp service, has accommodation for 12 passengers and a very pleasant journey it can be. The current *B.R. Continental Handbook* does, however, strike an ominous note with the remark that this accommodation is available until December 31 only. The Zeebrugge train ferries also carry 12 passengers in comfortable accommodation.

It seems a pity that the Antwerp passenger service has virtually ceased and the Zeebrugge prewar summer service has never restarted despite the reconstruction of the Mole station and other facilities. No doubt, however, the Belgian Marine Administration, following recent heavy capital expenditure on new ships, would be powerful objectors to any revival of the two routes, despite repeated summer congestion on the Ostend route.—Yours faithfully,

A. P. LAMBERT.

10 Alderton Crescent,
N.W.4.

★

THE AEROPLANE

(Continued from page 7)

sitive to changes in cruising conditions and be capable of little development; the wing would have an aspect ratio of about 3 with a 50-60 deg. sweep back; this should bring no unduly difficult low speed and landing problems. The next speed would be about 1,200 m.p.h., when an economic cruising performance would be obtained with a very slender wing plan form of aspect ratio unity and sweepback 70-80 deg.; this would probably take the form of an all-wing aircraft of say 7,000-8,000 sq. ft. area, sufficiently large to contain the passenger accommodation. This configuration brings low-speed problems which we can expect to overcome by novel devices such as jet deflection; variable wing geometry, such as that projected by Dr. Wallis of Vickers may also be relevant. The next speed would be about 2,000 m.p.h. (Mach 3), where the turbo jet engine operates close to its optimum. Such an aircraft introduces entirely new problems of kinetic heating, and consequently of new structure and of new engine layouts. Its development would be a project of great magnitude, prudently to be undertaken only after experience at the highest lower speed possible with existing structures and development of known engines, possibly between 2.2 and 2.4 Mach.

"The development of faster aircraft, within the limits of conventional shape and structure, is likely to continue the historical trend in absolute terms of cheaper and cheaper flying. Costs per passenger mile have fallen from (say) 10d. in 1920 with speeds of 50 m.p.h. to 4d. in 1958 with speeds of 400 m.p.h. But it will be prudent to expect a stage at which, at least for an appreciable and expensive development period, the economy of the "faster and higher" philosophy reaches its optimum. Beyond this the desire for speed and very short travel times may have to be paid for: high Mach number flight requires also high altitude. The aircraft engineer is now faced with structural, aerodynamic and air cabin-conditioning problems which are likely to encroach on economic payload."

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NATIONAL INVESTMENT IN RAILWAYS

Will Pay "Handsome Dividend"

VASTLY SUPERIOR SERVICE FROM MODERNISATION

SPEAKING at the triennial dinner of the Great Yarmouth Chamber of Commerce last week, Sir Brian Robertson, chairman of the British Transport Commission said: "I am quite certain and so are my colleagues that the investment that the nation is making in British Railways will in the end pay a handsome dividend." He said he was certain of this in spite of the present difficulties, and added: "It is my job to see that this statement is translated into fact, and with my colleagues we intend to see that we do succeed." Discussing the question "Can British Railways be made to pay?" Sir Brian said: "It is a sort of two-sided question. Firstly, will it pay the country to have good railways? Secondly, will the receipts of British Railways ever cover their costs?

F.B.I. Believes in Railways

"Will it pay the country to have good railways or can we get on better without them? That is a question which you are as capable of answering as I am. I have quite recently had a fresh, strong indication from the F.B.I. that it considers an efficient railway system to be an essential to the economic prosperity of the country, and I feel little doubt that the Chambers of Commerce think likewise. If you do think so, gentlemen, then please give us your support in what we are seeking to do.

"Now for the second part of the question: will the railways ever pay in themselves? That is partly a technical question, and on the technical side you will have to take my word for it. Not mine alone, because the Commission is united on this subject and remember that the Commission consists of 14 men besides myself, men of eminence in a variety of fields, several of them in commerce, others in industry. Technically, the advantages of modern equipment and methods are such as to leave no room for doubt that the railways can be made to pay if they concentrate on the jobs for which they are best suited.

Well Publicised Difficulties

"In spite of our present difficulties, and they have been well publicised, I am quite certain and so are my colleagues that the investment that the nation is making in British Railways will in the end pay a handsome dividend. It is my job to see that this statement is translated into fact and with my colleagues we intend to see that we do succeed. It is partly a commercial question. Will the railways be sufficiently alert commercially to exploit their technical advantages? I hope that in this region especially (the Eastern Region), where reorganisation on a decentralised basis was first introduced, you are at least beginning to realise that the railways are awake commercially.

"Finally it is in part a question of the attitude of the public, including commerce and industry, towards the railways. There is still a lot of prejudice against the railways because they are nationalised. The railways of this country are not perfect, not as good as they should be, not as good as they will be provided that they are given the chance. Judge them on their merits, gentlemen, and not on the basis of your political beliefs.

Fares

"Then again how often do you hear people say 'The way they put the fares up is scandalous,' regardless of the fact that the fares have not gone up nearly as much as the goods which they sell themselves. I could say much more to the same effect, but if I were to do so you might think that I am squealing, which I am not. All I am saying is this: if the railways are to pay, the attitude of the public and of industry and commerce towards them must be fair and not biased.

"Because we are satisfied about the technical and commercial potentialities of the railways and because we have faith in the ultimate fairness of our fellow countrymen, we reply to the question 'Can the railways be made to pay' by 'Yes.' In saying this I do not forget that success depends upon the loyalty of the men and women who work on the railways. As modernisation progresses there are fewer of them, but they must be a confident and happy body."

Making Railways Pay

Earlier Sir Brian had said that "the policy to which the B.T.C. was required to work by Act of Parliament was that the railways must be made to pay. The Government was prepared to provide capital for their modernisation and to lend money to cover deficits incurred until the modernisation paid off. But they were not willing to do that indefinitely and it required the railways to win their own living in competition with other forms of transport. To that the B.T.C. did not object: all it asked was the tools for the job and the freedom to do it."

The B.T.C. had to work to the rules of the game as set by the Government of this country. They were not rules which made things particularly easy for the railways, but they were not impossible rules and it must accept them. They meant, as the Commission had always realised, that the service given by the railways would have to be much less extensive than that to which people had long been accustomed. There would be far less room for cross-subsidisation of poor paying services by more profitable ones. There would be far less chance of the railways solving the problem of rural transport, which in any case was a job for much smaller carrying units, such as buses. There could be no justifiable demand that the railways must always provide every possible facility to carry the peak traffics of business and holiday travel, though within reason the B.T.C. tried to do so.

Fully Competitive

"On the other hand within their own field (and I underline those words) the railways can be brought by modernisation to give a service to the travelling public and to commerce and industry vastly superior to that which they have given in the past and fully competitive with anything which can be offered by other forms of transport, public or private," said Sir Brian.

BOOK NOTICES

Trade and Technical

THE RAILWAYMAN'S DIESEL MANUAL. By William F. Bolton, A.M.I.Loco.E., M.S.A.E. (London: G. H. Lake and Co., Limited, 283 Archway Road, N.6. Price 7s. 6d.) The second edition of this extremely practical and helpful book is even better value than the first, which itself went into a third impression. Considerably enlarged, and brought up to date by its author, who is service manager of British United Traction, Limited, the coverage is remarkably wide for so small a volume. Although intended as a primer only, the interested railwayman will find that from its clearly written text and useful illustrations he can gain a solid understanding of the function of new diesel equipment now coming increasingly into use on British Railways, from railcars to main-line locomotives. An additional feature is a list of books recommended for further study.

* * *

AUTOMOBILE ELECTRICAL MAINTENANCE. By A. W. Judge, A.R.C.Sc., Wh.Sc., A.M.I.Mech.E., M.S.A.E. (U.S.A.). (London: Sir Isaac Pitman and Sons, Limited, Pitman House, Parker Street, Kingsway, W.C.2. Price 15s. 6d. net.) This is the fourth edition of this comprehensive and easy-to-understand manual which for 20 years has served the needs both of the service engineer and the user who likes to understand how his vehicle works and attend to his own servicing. Successive editions and reprints have kept pace with advances in vehicle electrical equipment and the present book has additional material in the form of a new chapter that follows the simple and compact presentation already established.

* * *

MEN AND MACHINES. A history of D. Napier and Son, Limited, 1808-1958. By Charles Wilson and William Reader. (London: Weidenfeld and Nicolson, 7 Cork Street, W.1. Price 35s. net.) This year, D. Napier and Son, Limited, joined the select band of British engineering concerns that have been in business continuously for 150 years and this book is fitting commemoration of the achievement. The subject is dealt with by the joint authors in an exceptionally interesting and readable manner, the thread of the company's activities having been expertly woven into the backcloth of general engineering history from before the days of Stephenson's *Rocket* to the age of rocket motors. Rightly, a major portion of the book deals with Napier's important contribution to the development of transport vehicles, for Napier cars were among the first British motor vehicles seriously to challenge the French domination of the industry in the early days of the century; few aero engines have had so long and successful a life as the Napier Lion; no other diesel engine approaches the specific power of the Napier Deltic, which powers many of the world's fast naval craft and is specified for a number of British Railways diesel locomotives; and a Napier-Railton car still holds the world land speed record of nearly 400 m.p.h. established in 1947.

One of 16 Hudswell Clarke diesel locomotives with Paxman Hi-Dyne 225-b.h.p. engine now in course of delivery to the Sierra Leone Government Railway is here seen in Freetown hauling an empty stock train into the terminus before leaving for Pendembu

Southend-on-sea electrification

Built by British Railways, Eastleigh works

The G&C has supplied complete electrical equipment for the 32 all-steel four-coach multiple unit sets used on the Liverpool St.—Southend-on-sea line.

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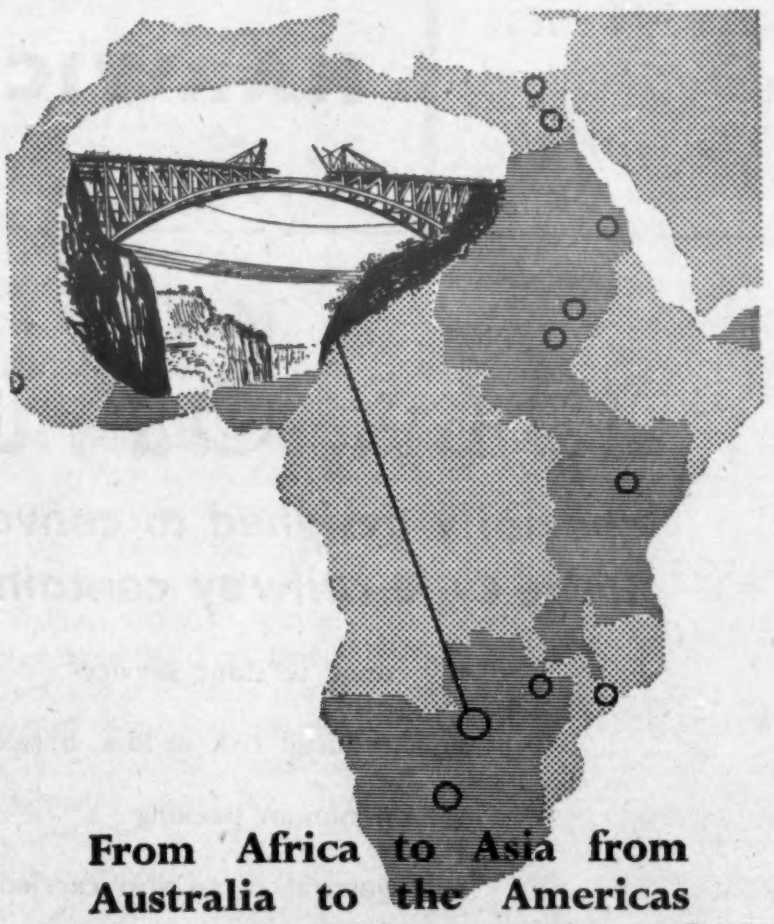

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NEWS FROM ALL QUARTERS

Flashing Indicators for London Buses

Work has now started on fitting 7,000 London Transport buses and Green Line coaches with flashing direction indicators as an additional aid to drivers and other road users after evolution of satisfactory equipment.

Last-Toll Ceremony

After 674 years tolls have been abolished on all vehicles making use of the new bridge which spans the Conway between Conway and Llandudno Junction. The last toll was paid by the Mayor of Conway, Councillor C. M. Roberts, and his ticket will go to the town's museum. The Mayor passed over the suspension bridge in a horse and cart and it cost him 3d.

Railway Wages Committee

The independent committee which is to inquire into railwaymen's pay will hold its first meeting next Monday to decide on procedure. By its terms of reference it will examine the rates paid on British Railways and those paid for comparable work elsewhere and issue a report with "observations and conclusions." The British Transport Commission does not agree that the committee should make definite recommendations on pay.

Coventry Ring Road Extension

The Minister of Transport has made a grant to Coventry City Council of nearly £290,000 towards the cost of constructing the second section of the Coventry inner ring road, estimated at £396,000. This section, 480 yd. long, will extend from Swanswell Terrace to Hill Cross on the northern side of the city and will include roundabouts at each end. There will be two 24-ft. carriageways. Demolition of property on the first section, between Quinton Road and London Road, is now proceeding.

Grand Prix for Rail Wagon

The West German rolling stock manufacturer Waggonfabrik Uerdingen A.G. of Krefeld, has been awarded a grand prix by the International Jury of the Brussels International Exhibition. The prize—the first in the rail vehicles section—was awarded to Waggonfabrik Uerdingen for its new design of goods wagon, which was exhibited by the German Federal Railway at the exhibition. Runner-up in this section was another West German manufacturer, Maschinenfabrik Augsburg-Nürnberg (M.A.N.), of Nuremberg.

Moving Pavement at Bank Station

The 300-ft. tunnel which will carry Britain's first moving pavement, connecting the Bank platforms of the Southern Region Waterloo and City line with the London Transport station, is nearly complete. Workmen have driven the 16½-ft. wide cast-iron-lined tunnel alongside the existing stepped subway popularly known as "The Drain." At night special trains have been run from the Bank to Waterloo to remove the hundreds of tons of London clay dug out by the workmen. There is to be a new ticket hall at the top, below the road, with a new subway to Poultry. It is anticipated that both pavements will be run in the same direction at peak periods, leaving the old subway for passengers in the reverse direction.

French Vehicle Rationalisation

Unic, a subsidiary of Simca and Willème, French commercial vehicle manufacturers, will, in future, co-ordinate their production so as to provide between them a complete range of industrial vehicles in the 4- to 35-ton range.

More London Buses for Christmas Shoppers

To help Christmas shoppers in the West End, full-length trains are now running on four Underground tube lines between rush hours. Some 70-80 extra buses for Christmas shoppers are also being run by London Transport in the West End and main suburban areas.

Passenger Services Going

The passenger-train services will be withdrawn from Three Counties and Arlesey and Henlow stations, situated on the East Coast main line, north of Hitchin on the Eastern Region on and from January 5 next. There will be no passenger trains to Copmanthorpe Station (between Leeds and York) nor to How Mill and Low Row (between Newcastle and Carlisle) on the North Eastern Region from the same date.

Railways Ready to Face the Winter

No difficulty in meeting the transport requirements of trade and commerce during the coming winter was anticipated by the British Transport Commission, it was reported last week at a meeting of the Winter Transport Central Joint Conference. Mr. J. W. Watkins, a member of the British Transport Commission, who was in the chair, emphasised that the efficiency of the Commission's services was at a higher level today than ever before, particularly with regard to the increased number of fitted freight trains giving assured delivery. The additional carrying capacity likely to be available this winter, he said, was due partly to the recent recession in the heavy industries.

Made His Own Ticket Rules

A Southern Region season ticket holder, Commander G. F. Hawkes, R.N., of Ardingly, Sussex, made an application before the Transport Tribunal last week for a declaration that second-class ticket holders on British Railways should be allowed, without paying excess fares, to occupy vacant first-class seats when no second-class seats are available. He said that if his application succeeded there would obviously be a difference in revenue because fewer excess fares would be paid. He accordingly suggested that all fares might properly be increased. Mr. Ernest Dickson, chief passenger officer, British Railways, said that last year revenue from first-class travel was £15 million. If the applicant's suggested rules were introduced "the whole of our first-class travel would be likely to disappear," which might mean an immediate loss of £5 million a year. The applicant said he had invented what he called a set of "Hawkes' rules" for determining whether, and how long, he occupied a first-class seat. Decision will be given later. The Tribunal commences its hearing of the application by the B.T.C. for new passenger charges schemes on December 18.

A new cargo vessel for the

HARWICH—ROTTERDAM SERVICE

M.V.

ISLE OF ELY

specially designed to convey large type railway containers

- ✱ **door to door service**
- ✱ **reduced risk of loss, breakage or damage**
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- ✱ **general cargo also carried**

rail wagons run alongside vessel

Three sailings each week giving an excellent service to Holland and the hinterland of Europe. Fast rail services connect in all directions. Further information obtainable from Continental Traffic and Shipping Manager, Harwich House, 129 Bishopsgate, London, E.C.2.

BRITISH RAILWAYS **RAPID — REGULAR — RELIABLE**

COMMERCIAL AVIATION

Silver City Cuts More Rates

RECONFIRMATION ABANDONED

FURTHER substantial reductions in the cost of flying a car to France or Belgium have been announced by Silver City Airways, which has made fare reductions of one kind and another nine times in 10 years. The reductions for 1959 aim to benefit owners of the small and medium family cars which comprise the bulk of the cross-Channel traffic. On the busiest route, that from Lydd to Le Touquet, existing cheap-rate winter fares will continue to June 1. Thereafter small- and medium-sized cars will be charged up to 27½ per cent less than last summer's standard rates. A Morris Minor, to take one example, will go for £5 single, inclusive of insurance, as against £6 10s. last summer. Peak fares, charged on weekend days in July, August and early September, will also be cut by up to 21½ per cent. Owners of mopeds and other power-assisted two-wheelers of up to 100 c.c. will only have to pay 2s. 6d. in future instead of £1 and motor-cycles with sidecars will now pay the smallest car rate.

On the routes from Lydd to Ostend and from Southampton to Cherbourg, where traffic has been increasing particularly well, fare cuts are greater—up to 37½ per cent—for small and medium cars than on the Le Touquet route. The Lydd—Calais service will also have cuts for small and medium cars, but there will be small increases for some larger models, and similar increases will apply to the Ostend route. Vehicle rates on the Southampton—Deauville service and all passenger fares remain unchanged. Subject to Government approval Silver City will introduce a £3 5s. cheap day passenger return fare between Lydd and Le Touquet. If the British and French Governments agree, no-passport day trips will also be introduced.

Consolidated Cargo by B.O.A.C.

The first consolidated air cargo shipment to be carried from Japan to Britain arrived by B.O.A.C. Britannia at London Airport on December 4. It is hoped that regular shipments of this kind will now be made between the two countries.

Nairobi Airport Plaque

A bronze plaque, with Britannia model in relief, was presented by the British Overseas Airways Corporation at a ceremony at Nairobi Airport on December 2. The plaque commemorates the opening of the airport in March this year and marks the completion of 27 years of commercial operation between Kenya and the United Kingdom by Imperial Airways and B.O.A.C., in association with Wilson Airways and East African Airways Corporation.

A.B.C. Airways Guide Improved

The latest edition of the *A.B.C. World Airways Guide*—for December—includes for the first time the foreshadowed European quick reference section. This it may be said turns out to be all that could have been hoped. If we have a criticism, it is that the italic type used to differentiate connecting from through services is a little difficult to read in quantity. The opportunity has also been taken to plan the regrouping of the European service tables and this will be carried out in the January issue. When completed the value of the timetable, particularly to agents, will be further enhanced. Price of the guide is 12s. 6d.

American Abandons Reconfirmations

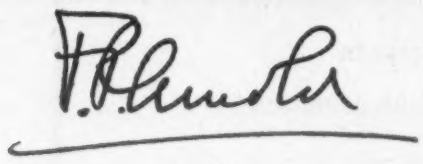
American Airlines ceased on December 1 to require passengers to reconfirm reservations. Previously, under certain circumstances, passengers holding return or continuing reservations had to reconfirm their intentions to use such reservations at least six hours before the scheduled departure. This rule allowed the airline to resell the seat reserved for a passenger unless the passenger has reconfirmed. A.A. considered that the rule placed an unreasonable burden on the travelling public. The reconfirmation rule was originally adopted by U.S. domestic airlines as part of a programme to reduce no-shows. American intends to continue efforts to prevent no-shows, but is doing so by placing emphasis on improved internal reservations procedures.

British Traffic in July

During July, 1958, capacity ton-miles offered by United Kingdom airlines on their scheduled services increased by 15.7 per cent and total traffic carried rose by 9.6 per cent, freight ton-miles increased by 2.4 per cent and mail ton-miles increased by 6 per cent. 561,680 passengers were carried, or 0.2 per cent more than in July, 1957, and these passengers travelled 314.1 million passenger-miles, or 11.5 per cent, more. The overall load factor fell from 65 to 61.6 per cent. During the five-week period ended July 26, capacity operated on B.O.A.C. scheduled services went up by 17.9 per cent compared with the corresponding period in 1957—capacity on Western routes increased by 49.9 per cent but on Eastern routes decreased by 0.7 per cent. Total traffic carried rose by 41.9 per cent on Western services but decreased by 4.2 per cent on Eastern services. The total of 43,373 passengers carried by B.O.A.C. was 5.3 per cent more than during July, 1957, and these passengers flew 143.2 million passenger miles, or 18.2 per cent more. The overall load factor dropped from 64.5 to 61.8 per cent. B.E.A. offered a total of 10.1 per cent more capacity on scheduled services than in July, 1957; capacity on international services increasing by 14.3 per cent but on domestic services decreasing by 0.4 per cent. Traffic carried rose by 4.5 per cent with 191,901 passengers, or 5.2 per cent more, travelling on international routes and 168,840, or 6.3 per cent less travelling on domestic routes. These passengers flew 86.4 million passenger-miles, or 6.4 per cent more on international services and 35.6 million passenger miles, or 3.1 per cent less, on domestic services. The overall load factor fell from 65.3 to 62 per cent.

The private companies operating in association with the corporations provided 16.2 per cent more capacity ton-miles on scheduled services in July, international capacity showing an increase of 23.4 per cent but domestic capacity showing a decrease of 0.7 per cent. International freight traffic went up by 15.1 per cent while domestic freight dropped by 8.3 per cent (reflecting the suspension of domestic vehicle ferry services). Passengers carried totalled 152,242 or 0.1 per cent more, and these passengers flew 30.3 million passenger-miles or 10.6 per cent more. There was an increase of 7.8 per cent in the number of passengers carried on international routes but a decrease of 7.1 per cent on domestic routes. The overall load factor fell from 65.7 per cent in July, 1957, to 61 per cent in July, 1958.

52 YEARS IN ROAD PASSENGER TRANSPORT



Mr. F. P. ARNOLD M.Inst.T.

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On December 31 Mr. Frederick Percival Arnold, a member of the Tilling Group management board of the British Transport Commission, will retire, as already announced in MODERN TRANSPORT. Beginning his transport career with Wolverhampton Corporation in 1906 he will thus have had some 52 years in the road passenger transport industry. In 1913 he entered the service of Kidderminster and District Lighting and Traction Co., Limited, which was controlled by the British Electric Traction Co., Limited, and operated trams and buses besides supplying electricity. He served in H.M. Forces in the 1914-18 war, returning in 1919 to an appointment with the Birmingham and Midland Motor Omnibus Co., Limited, under Mr. L. G. Wyndham Shire. In 1932 he joined Thomas Tilling, Limited, as chief engineer at Bull Yard depot, Peckham, from which point the Tilling London fleet of buses and a large number of haulage vehicles were controlled. Shortly afterwards, Mr. Arnold was transferred to the Thomas Tilling head office and his duties extended to various provincial bus operating companies. He became a director of a number of these undertakings. In 1948, when Thomas Tilling, Limited, sold its interests in provincial buses to the British Transport Commission, he became a member of the Tilling Group management board, being a director of many of the subsidiary bus companies. He has taken a particular interest in engineering and stores matters. In addition to resigning from the management board, Mr. Arnold is relinquishing his chairmanships of United Automobile Services, Limited, Crosville Motor Services, Limited, West Yorkshire Road Car Co., Limited, and Brighton, Hove and District Omnibus Co., Limited, as well as his appointments to the boards of other operating companies in the Tilling Group and such concerns as London Coastal Coaches, Limited. Endowed with great energy, a keen sense of humour and a human outlook on business he is a skilful negotiator and played a great part in the success of co-ordinated working at Brighton, as well as in the development of high engineering standards in the bus industry. He is a member of the Institute of Transport.

M. AND G.N. AREA

Transport Reorganisation

BUS AND LORRY FACILITIES

THE Eastern Region advises us of its plans for revised passenger and freight services in the Peterborough—Yarmouth area consequent upon closure of the M. and G.N. line, which is now firmly fixed for midnight on Saturday, February [illegible]59. The Eastern Counties Omnibus Co[illegible]ed (a British Transport Commission un[illegible]g) proposes to operate more than half-a-million extra bus-miles a year. Other bus undertakings in the area affected will also improve their services. This follows confirmation recently, by the Central Transport Consultative Committee, of the recommendations of the East Anglian and East Midland Transport Users' Consultative Committees.

New Bus Services

Application has been made to the Traffic Commissioners for licences for new and improved bus services on the following routes:

Eastern Counties Omnibus Company

New Services
No. 401 Kings Lynn—Melton Constable—Yarmouth
No. 402 Norwich — Lenwade — Hindolvestone — Melton Constable.

Improved Services
No. 336 Kings Lynn—Peterborough (replacing No. 41 and No. 336)
Spalding—Tongue End.
Fakenham—Norwich.

Lincolnshire Road Car Company

Improved Services
Spalding—Melton Mowbray.
Spalding—Kings Lynn.

Private Operators
R. R. Allen — Guestwick—Norwich
A. Brown — Wisbech—Murrow.

Passenger train services will be withdrawn from the following sections of line:

Saxby to Sutton Bridge
Peterborough to Sutton Bridge
Sutton Bridge to Melton Constable
Melton Constable to Yarmouth Beach
Melton Constable to Norwich City.

To improve the facilities for seasonal travellers, new signalling will be installed approaching Yarmouth Vauxhall and at the terminal, to enable summer holiday trains to be dealt with in greater numbers. Plans also include lengthening of platforms, new carriage sidings and improved amenities. The provision of a covered queueing area and improved toilet facilities are also being considered. It is the aim to complete much of this work by next Whitsun.

Freight Facilities

In the case of freight traffic, the M. and G.N. area will be well served by extended rail cartage facilities radiating from established railhead depots. Spur lines, linking up with the Great Eastern lines, are being retained. As a result of this planning, freight train services will be withdrawn on the following sections:

South Witham (excl.) to Bourne (excl.)
Wisbech North (excl.) to Sutton Bridge (excl.)
Sutton Bridge (excl.) to South Lynn (excl.)
Gayton Road (excl.) to Melton Constable (excl.)
Melton Constable (excl.) to Yarmouth Beach.

The freight train service between Bourne and Billingborough will be retained.

Mr. H. C. Johnson, general manager, Eastern Region, said: "At the hearing, I gave an assurance that the British Transport Commission had no intention of abandoning the area of the M. and G.N. line. I would like to emphasise that traders and public alike, will continue to be well served. The extended cartage services for freight and parcels, in particular, will cater for old and new customers who wish to consign their traffic by rail."

During the hearing, it was estimated that the direct saving from the reorganisation would be £640,000 a year. Taking other factors into account, the total saving is likely to be of the order of £1 million per annum.

★

PUBLICATIONS RECEIVED

NEW LIGHT ON DUMPER ECONOMY. Brochure issued by Chaseside Engineering Co., Limited, Aldwych House, London, W.C.2, illustrating and describing the new Chaseside Hi-Speed dumper of 13,500 lb. (4½ cu. yd. heaped) capacity.

TORCH. ISSUE NO. 19. The autumn, 1958, edition of the quarterly technical bulletin of British Oxygen covers the usual wide range of subjects and includes a comprehensive article on lead welding and an illustrated description of stages in the demolition of the Liverpool Overhead Railway.

PRESSURE DIE CASTING IN HIDUMINIUM. A brochure issued by High Duty Alloys, Limited, Slough, Bucks, setting out the advantages to be gained by the use of pressure die castings in high-quality material, with which intricate designs can be produced to great accuracy, thus reducing subsequent machining operations to a minimum.

ROCOL MOLYBDENISED LUBRICANTS. A comprehensive guide to the use of a range of molybdenised lubricants for a wide variety of applications, published by Rocol, Limited, Rocol House, Swillington, near Leeds, the firm which has pioneered the development of specialised lubricants incorporating molybdenum disulphide.

GUIDE TO SURFACE DRESSING. This is a reprint of the popular guide which was first issued by the British Road Tar Association some time ago and of which over 10,000 have been distributed. It brings the guide completely up to date to agree with the revised Road Note No. 1. The revision includes separate recommendations for different intensities of traffic. It will be found especially useful for engineers and highways superintendents actually engaged in the work of surface dressing.

NOTES ON TARRED CHIPPINGS. Describes a special technique for surface dressing based on the principle that tarred chippings adhere to the spray film of tar more rapidly than ordinary chippings. The technique has been successfully used in many parts of the country. Surveyors and contractors are advised to contact their road tar supplier for further details, but supplies of the leaflet can be obtained from the British Road Tar Association, 9 Harley Street, London, W.1.

WELDING ALUMINIUM. Third Edition published by Northern Aluminium Co., Limited, Banbury, Oxfordshire. Since first publication of this useful book some three and a half years ago, when the methods available for welding light alloys were not very widely known nor the characteristics of aluminium welded joints fully appreciated, great advances have been made both in technique and the amount and scope of work done. As previously, this extensively revised edition deals almost exclusively with the two shrouded arc processes—argon tungsten arc and inert metal arc—and much of the space is taken up with tables of procedures. The information on processes has been brought up to date, a section has been added on welding technique and the tables of procedures—still the most useful part of the book—have been entirely revised, with full explanatory notes and illustrations giving edge preparation and joint details. An appendix has also been added giving information on alloys and current ratings.

RUBBER IN ROAD ENGINEERING, TECHNICAL NOTE NO. 3, recently published by the Natural Rubber Development Board, is entitled NATURAL RUBBER FOR ROADS—A REVIEW OF RESEARCH AND EXPERIMENT. It describes the laboratory and full-scale research undertaken by the Road Research Laboratory in collaboration with the British Rubber Producers' Research Association and the Natural Rubber Development Board. This research, which still continues, includes investigations into the effect of rubber on the viscosity and low-temperature extensibility of bitumens and sand asphalts; penetration, softening point and brittleness tests; and assessment of rubberised bitumen binders. Tables give the recommended blending conditions for the three powders at present commercially available. Methods of preparing rubberised bitumen and rubberised plant-mixed carpet materials are dealt with and the booklet concludes with a description of work done on rubberised tar and of the full-scale surface dressings laid in September of last year with this type of binder.

CLASSIFIED ADVERTISEMENTS

CLASSIFIED ADVERTISEMENTS should be addressed to THE MANAGER, Classified Advertisements, MODERN TRANSPORT, Russell Court, 3-16 Woburn Place, London, W.C.1.

RATES.—The minimum charge for classified advertisements is 7s. for 14 words or less, and 6d. for each additional word. The name and address of the advertiser is charged at the same rate. If a box number is used 2s. extra is charged to cover our name and address and postage. If set in paragraph form each paragraph is estimated separately. Official Notices and semi-display in the classified columns are charged at the rate of 40s. per single column inch.

ACCEPTANCE.—Advertisements can be accepted up to 2.30 p.m. on Monday to ensure insertion in the current week's issue. MODERN TRANSPORT is on Sale every Friday.

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SKILLED MOTOR MECHANIC (experience of diesel engines and heavy commercial vehicles essential) required for large industrial firm near Wembley. Pension fund, sports club, canteen, etc. Apply with full details of experience to Box No. 3807, MODERN TRANSPORT, 3-16 Woburn Place, W.C.1.

PUBLICATION

NINETEENTH CENTURY RAILWAY CARRIAGES by C. Hamilton Ellis. Profusely illustrated—obtainable from the publishers.—MODERN TRANSPORT Publishing Co., Limited, 3-16 Woburn Place, London, W.C.1. Price 22s. including postage.

A Subscription to

MODERN TRANSPORT

will keep you in touch with all British and Foreign transport developments

THE FUTURE LIES WITH PALLETISED CARGO

Experience of Three Scandinavian Lines

WHETHER or not the European Free Trade Area now comes to fruition the seed of European common marketing has been sown long enough for the idea to commence germinating; already some Continental ports are handling tonnage to the detriment of our own ports and it must be confessed that labour troubles here and port working practices not attuned to the modern need for fast turnround have not helped in this respect.

One solution to the situation lies clearly in a rapid expansion of cargo palletisation, certainly in the European short-sea trades. Unit loading and trucking is well proven in Scandinavia and is being tried with success in other western European ports. Its advantages are readily seen in the operations of three Scandinavian lines trading to the Tyne. The Swedish Lloyd, Fred Olsen, and Bergen Lines must be numbered among the most progressive of owners engaged on the short-sea trades. Their enthusiasm for rapid cargo-handling and quick turnround have resulted in startling savings in time, money and effort at the Newcastle call which all three make.

Unit Loads

Cargo is shipped on pallets and remains in units throughout the shipping cycle. To obtain rational utilisation of hold space without stacking, all three shipping lines load pallets with approximately 1½-2 tons, built up to the height of the ships' decks. This obviates broken stowage. To handle these optimum-sized loads to and from the crane, fork trucks work ashore, stacking and warehousing, pallet trucks aboard ship, moving unit loads from the plumb of the crane into the hold or vice versa. Cargoes arriving at Newcastle include dairy produce, timber, and heavy tonnages of fish. Ships leaving the Tyne carry mixed general cargoes—household goods, steel and chemicals.

Palletisation and trucking of cargo brings problems in ship design. Working surfaces usually inhibit truck operation, unless the decks have been flushed and hatch combings done away with. Lower holds should also be squared up to prevent shifting of unitised cargo. The latest vessels to join the Swedish Lloyd fleet on the North Sea trades—*Ofelia*, *Celia* and *Valeria*—incorporate these developments. They are true "paragraph ships" in that, with a gross tonnage of just 500 tons, they can be manned on a two-watch system. The fastest of the pallet ships is undoubtedly the Bergen Line's 22-knot motor vessel *Leda*. This was built for palletised cargo—as were Fred Olsen's *Blenheim*, 4,766 tons, and *Braemar*, 4,776 tons.

Lightweight Pallet

Pallets in use vary according to the preferences of the three lines. The bulk of the cargo shipped to the Tyne by the Bergen Line is fish, for which Markussen pallets are used. These are made from welded steel tube, combining great strength with lightness. It is claimed that the Markussen is 50 per cent lighter than a normal timber pallet. The actual weight is approximately 84 lb., dimensions 63 in. by 36 in. The great advantage of this pallet is that it nests and a stack of 16 equals the height of only four ordinary wooden pallets. Storage space is thus reduced by 75 per cent. This advantage is clearly shown on the Bergen Line, where all pallets surplus to immediate requirements at Newcastle are shipped back to Bergen if there is insufficient outward cargo from the Tyne.

On the Swedish Lloyd Line, one basic type of pallet is used. This is a four-way entry double-faced wooden pallet to which a clamp bridle is attached when it is being craned. The pallets are secured at the top with a net which affords security at sea and enables the cargo to be handled when rough weather could cause movement.

For industrial trucks, port operations are among the toughest of all industry. Moreover, handling cargoes aboard ship, trucks have to work in sub-zero temperatures on floors often awash with fish oil, salt water and ice. To work in the wings and ends of a ships' hold, trucks must be manoeuvrable and there must be no fumes. Trucks must thus be robust and reliable, withstand poor working conditions and temperature variations, and be simple and safe to operate.

Results

By introducing palletisation and power trucks, more work can be completed by dockside labour in a given time. Since the introduction of trucking, dockers on the Tyne Commission Quay in Newcastle have more than doubled the hourly tonnage handled from Bergen and Olsen vessels. It is now possible to discharge as much as 18 tons per gang-hour, with an hourly average of 14 tons. Similar increases have occurred for Swedish Lloyd ships, where about 400 tons of inward and outward cargo are handled each trip. Hourly tonnage figures for this application are 25 tons per gang as compared with 10-12 tons previously. The highest figures for Swedish Lloyd ships so far achieved are:

(*a*) discharging: 40 tons per gang-hour;
(*b*) loading: 47 tons per gang-hour.

In addition, cargoes are now handled with a greatly decreased incidence of damage. All three lines employ Yale Worksaver power pallet trucks; those of the Bergen and Olsen lines work a complete round voyage without recharge, the Swedish Lloyd trucks are conveniently charged and maintained at sea.

Ships cleared expeditiously enable others to take their places earlier and in consequence spend less time in port. Palletisation has reduced the time for Swedish Lloyd vessels at Gothenburg from five days to one. Discharging and loading in this country has been reduced from 1½ days to five hours. These savings mean that a round trip (Gothenburg—Leith—Newcastle) takes a week—as opposed to a fortnight with standing cargo

Fishboxes on a Markussen welded steel tube pallet being moved on a Yale pallet truck square of a hatch

vessels. Turnround times for ships of the Bergen Line have been halved with 22-knot vessels now making two round trips a week. Before the advent of mechanisation and fast vessels, one round trip took five days. Quicker handling through palletisation and trucking have permitted both the Swedish Lloyd and Bergen Lines to carry the same amount of cargo annually with one ship instead of two.

Bigger Wage Packets

Newcastle dockers have welcomed the advent of this type of cargo handling. Palletisation and trucking have guaranteed them more work, since pallets can be loaded and unloaded even when ships are not in port. This has levelled peak work loads and stabilised employment. Forty-two Newcastle men, working Bergen Line ships, are now employed on a semi-permanent basis and are guaranteed a minimum weekly wage.

Tyneside labour engaged to work Swedish Lloyd ships has also readily accepted the system. Average earnings were originally 5s. to 6s. 6d. an hour. With trucking and palletisation, docker's wages have leapt to 10s. 10d. an hour and the men are now paid the same amount for one day's work as they were previously getting for two. With a day in hand to work other ships, labour is benefiting all ways.

These, then, are the three outstanding returns achieved by the progressive introduction of unitised cargo and trucking schemes: greatly accelerated ship turnround; a reputation for quicker turnround in the port—and that means increased trade; higher output per gang-hour, therefore higher earnings and a contented labour force.

For the convenience of customers in the Home Counties a warehouse and service depot has been opened by the Compoflex Co., Limited, at 109 High Street, Godalming, Surrey (telephone Godalming 2269) where a complete range of standard hoses will be carried.

A new hand tool with applications in many industries introduced by Stanley Works (G.B.), Limited, is named the Stanley Shaper; it will shape and finish most surfaces, including wood, leather, plastics, asbestos, brick, rubber and mild steel. The tool is being produced initially in both file and plane versions.

A new British Standard BS3014:1958 "As welded" and cold-drawn welded austenitic stainless steel tubes for mechanical, structural and general engineering purposes, specifies requirements for "as welded" and cold-drawn welded tubes manufactured from austenitic stainless steel strip welded across the abutting edges throughout their length. Copies can be obtained from the British Standards Institution, British Standards House, 2 Park Street, London, W.1, price 4s. 6d. (postage extra).

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Says Mr. N. Holt, Transport Manager of W. & C. French Ltd., Buckhurst Hill, Essex.

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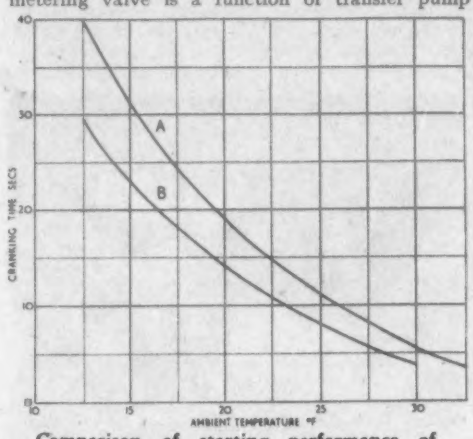
THE DIESEL ADVANCES

C.A.V. DPA Pump Widens Scope

2—GOVERNING AND PERFORMANCE*

THE all-speed hydraulic governor of the C.A.V. DPA pump is an extremely simple mechanism and it should not be confused with the hydraulic governor developed for in-line pumps. Its performance is more akin to that of the pneumatic governor now in wide use on automotive diesels and in fact it can be described as a self-governing device since its control over the metering valve is a function of transfer pump



Comparison of starting performance of DPA pump having starting retard (B) with in-line pump having excess fuel (A) on four-cylinder direct-injection engine

pressure, which varies with speed, balanced by a spring. An additional idling spring comes into play when the engine control lever or accelerator is moved towards the idling position.

Automatic Timing

The hydraulic governor mechanism, which is housed in a small casting attached to the side of the pump body, employs a sliding metering valve, but a rotary valve is used with the all-speed mechanical governor, the essential parts of which (flyweights and springs) are, as already mentioned, carried on the driveshaft in a longer casing.

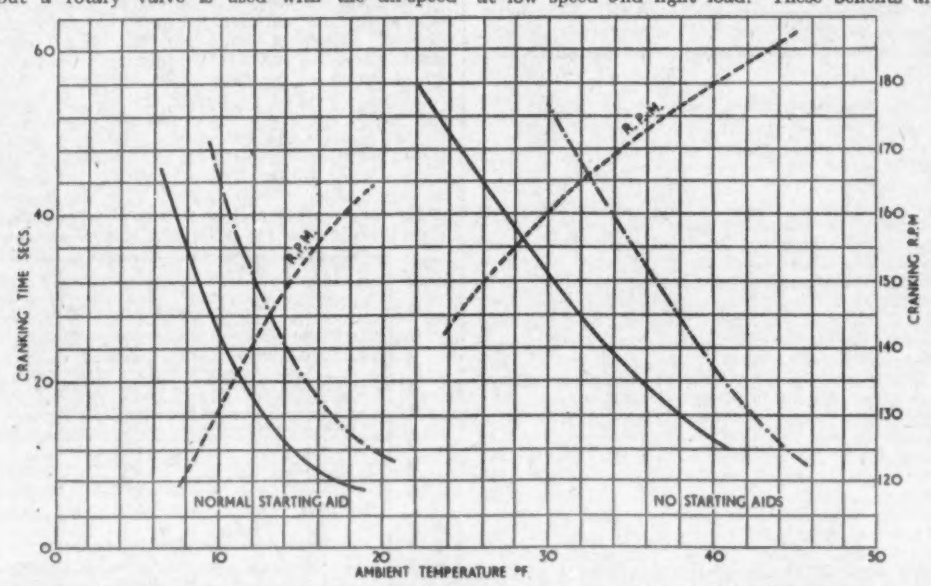
One of the outstanding advantages of the DPA pump is the ease with which automatic variation of the injection timing can be incorporated compared with a rotating-camshaft pump. It is provided in the DPA pump by rotating the normally stationary camring by means of a simple hydraulic servo receiving its oil supply from the transfer pump. Use is made of the variation in transfer pump pressure with speed, the pressure being applied to a spring-loaded piston which controls the position of the camring. By the choice of suitable springs a wide range of timing characteristics is possible and advance can be progressive over the whole speed range or restricted to any part of the range as best suited to the requirements of a particular engine or duty. A simple manual control, which can provide full retard to give easier cold starting and is returned to the full advance position when the engine is running, can also be fitted. Frequently this removes the need for excess fuel for cold starting, though this feature is available if required.

In the fuel system associated with the DPA pump there is a return fuel line from the camring housing to the filter which not only permits air entrained in the fuel in the pump to be bled off but insures circulation of the fuel to provide lubrication for the lower portion of the pump. Fuel reaches an annular groove in the rotor shank at transfer pump pressure and a second groove allows fuel to reach the lower part of the rotor and to flood the space in which the cam rollers operate before it is discharged through the return pipe. Thus the whole of the pump mechanism runs in fuel oil and the pump and governor form an oil-tight unit from which the fuel pressure tends to prevent the ingress of dust and water. The always positive fuel pressure also prevents cavitation in the pumping chamber during charging and thus contributes towards obtaining regular injection and close calibration.

Performance Characteristics

The DPA design permits a range of plunger sizes from 4.5 mm. to 10 mm. in steps of 0.5 mm. The maximum plunger stroke is 2.2 mm. and the recommended maximum fuel output is 100 cu. mm. per stroke at present, though engines requiring considerably greater deliveries are operating well.

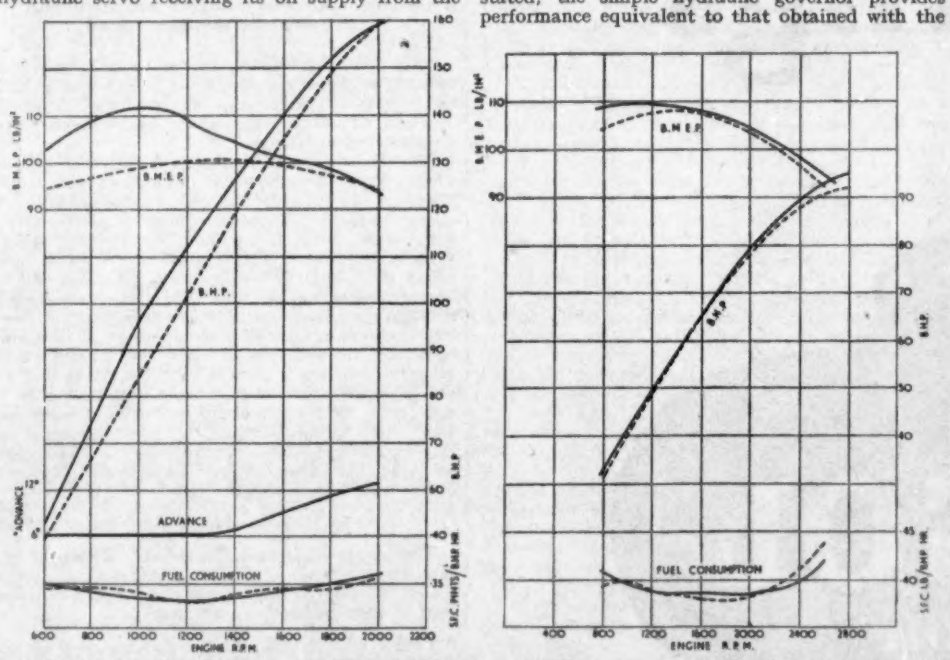
Although the DPA pump differs radically from the in-line pump, its performance characteristics are generally similar and in a number of cases show fairly marked superiority. These advantageous performance characteristics, some of which are illustrated in the accompanying illustrations, are in fact derived from the great flexibility of the distributor pump in the control of fuel injection timing and the manipulation of the fuel delivery characteristic. These can be so ordered as to provide improvements in certain aspects of performance, for example, a gain in torque at either or both ends of the speed range, easier starting and reduction of noise and smoother running at low speed and light load. These benefits are achieved with a minimum of additional cost and complication.



Curves showing influence of timing on starting performance of 2½-litre indirect-injection engine with and without starting aids. Solid line shows performance with 13 deg. injection advance before top dead centre and chain line with 18 deg.

In contrast to the helix-controlled plunger pump, which has a tendency to increase the amount of fuel delivered per cycle with slight increase of speed at light load for a given rack setting, the DPA pump has an exactly opposite characteristic, considerably easing the work required of the governor mechanism. As already stated, the simple hydraulic governor provides performance equivalent to that obtained with the pneumatic governor of an in-line pump, while the all-speed mechanical governor gives an extremely close control of the order of 2 to 3 per cent.

The successful development of an entirely new type of fuel-injection pump and installation of large-scale production facilities in so short a time by C.A.V., Limited, is a noteworthy achievement. The reduction in cost made possible by the new unit and the valuable technical advantages it makes available to engine manufacturers and users must rank as a major step in the advance of the high-speed diesel engine.



Comparison of performance with DPA (solid line) and in-line pumps on 11-litre direct-injection engine; right, comparison of 5-litre direct-injection engine with DPA pump with automatic advance (solid line) and in-line pump with fixed timing

* The first part appeared December 6.

COMMER FOR LONG LIFE!

After 200,000 miles—engine good as new!

Goldthorpe's of Penistone bought a Commer 12 ton tractor in March 1954. They now inform us that—"after 200,000 miles the engine is running as well, if not better, than when new". In their experience, they add, the Rootes 2-stroke diesel engine is ". . . one of the most economical on the road to-day". After day and night, 1500 mile-a-week running, never hauling less than its full load, the Commer still does over 16 m.p.g! Apart from normal maintenance, the engine hasn't been touched in all this time, and their letter concludes—"We have taken delivery of another Commer 12 ton tractor and a 7 ton tipper—both fitted with this remarkable engine, of course".

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BODEN SEMI-TRAILER

With Cary Laminaire Suspension

ADVANTAGES claimed for Laminaire vehicle springs, manufactured under licence in this country by William E. Cary, Limited, are truly progressive suspension, giving increase of spring stiffness in proportion to the load applied, and the ability to take the place of standard leaf-spring systems without major alteration or addition to the chassis. The Laminaire system has been adopted by Boden Trailers, Limited, Royton, Oldham, for its new 12-ton semi-trailer, which is the first of a range covering capacities from 10 to 20 tons planned by this manufacturer.

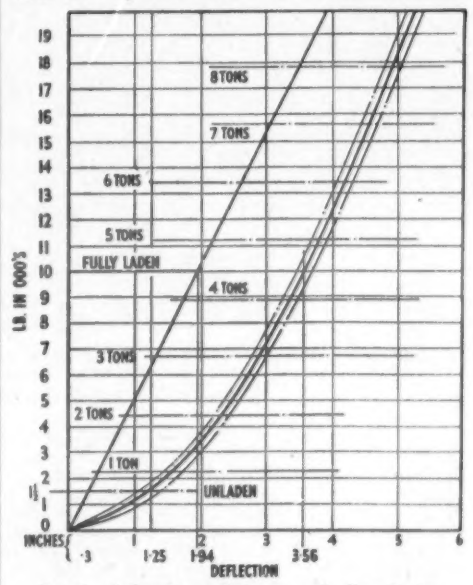
The design of the Laminaire system differs from ordinary leaf-spring suspension mainly in the method of support of the rear end of the spring; the front end is attached to the chassis through a spring eye and shackle pin in the normal manner.

Cary Laminaire suspension fitted to Boden 12-ton semi-trailer seen in unladen position

The rear end is flat and free to slide and is supported by a very flexible cantilever—a short laminated support spring secured to the chassis frame in a spring shoe. In the unladen condition only the tips of the main spring and cantilever are in contact and a large deflection is obtained mainly through the great flexibility of the cantilever, the main spring deflecting only slightly.

Increased Stiffness

As load is increased the end of the main spring rolls along the support spring, decreasing the effective length of both and so progressively increasing spring stiffness; the support spring goes out of action in the fully laden condition, when the main spring is supported by the cantilever shoe which due to its shape separates the tips of the two springs and relieves the cantilever spring of load. Excessive rebound in the unladen state is checked by a rubber bush or roller fitted in the cantilever shoe, which registers with the bottom of the main spring and keeps the tips in contact when the suspension is in the free state. Laminaire



Load deflection diagram of Laminaire system (triple line on right) compared with that of a constant-rate spring

is said often to be lighter in weight than dual-rate systems employing auxiliary or helper springs and the bolt holes used for securing the shackle brackets of a conventional spring can be used to secure the Laminaire support shoe.

The Boden 12-ton semi-trailer, type 1210L, has 12-in. deep pressed-steel channel-section side-members and closely spaced crossmembers. A 10-ton capacity cambered tubular axle is fitted with large Timken tapered-roller-bearing hubs. Wheels are 10-stud fitting and have 6.00-20 rims fitted with 9.00-20 12-ply tyres. Girling mechanical brakes 15½ in. by 6 in. have single-line vacuum operating equipment as standard but two-line vacuum, combined air-vacuum or air-pressure operation are available at extra cost. Fifth-wheel kingpin coupling is to S.M.M.T. Standard No. 37 and a lightweight oil-bath screw landing gear is standard. Bodywork comprises a steel subframe and 1-in. hardwood floor in 7-in. pressed-steel rave channel. Headboard, drop sides and tailboard are available optionally and aluminium bodywork can be supplied as an alternative.

The Amar Tool and Gauge Co., Limited, has introduced a range of nitrided plug and gap gauges which are said to have a life of four to five times that of their ordinary counterparts.

Claimed to be the only one of its type in the world, a new micro-spot cathode-ray tube capable of resolving 5,000 lines is now available from the electronics department of Ferranti, Limited. Measuring 5 in. across, the new 5/71 CM tube has been developed for airborne applications such as aerial mapping. The spot size is considerably less than one-thousandth of an inch in diameter.

Oil has been found in two more wells in Nigeria, where B.P. and the Royal Dutch-Shell Group are associated in oil exploration activities. Further tests will be necessary to determine the significance of the new discoveries, which are at Krakrama and Ebubu. Both wells were drilled to depths of approximately 12,000 ft. in a little over two months. The Krakrama well is located in the heart of the Niger Delta swamps.

HANDLING OF RAIL FREIGHT TRAFFIC

A Revolution in Progress

ONLY ROAD-RAIL TRANSFER DEFIES SOLUTION

THE railways are willing and anxious to try anything which appears likely to enable them to handle and tranship freight more efficiently, said Mr. A. E. Flaxman, A.M.Inst.T., commercial officer, Western Region, B.R., in a paper which he presented to the Railway Students Association at a meeting in London on November 26. They realised that they must spend a great deal of time and money on research and experiment; that quite a large proportion of their efforts would prove negative; that some really brilliant ideas, while technically feasible, would be impossible to justify economically; but that from out of all their investigations they would produce a number of solid contributions.

In goods shed operations the objective remained the elimination of the unproductive effort involved in trolleying packages over long distances with comparatively light loads, by the introduction of bulk movement of goods usually across or along platforms. Attention had been mainly directed to mechanical aids in the form of slat conveyors, unloading machines, platform trucks of various types and stillage working. They were not yet satisfied that slat conveyors were the complete answer to the problems and were therefore proceeding rather cautiously, particularly as new methods emerged from time to time.

Driverless Platform Tractor

An entirely novel form of conveyor had, for example, been installed for handling returned empties at the Small Heath depot in Birmingham (MODERN TRANSPORT, March 9, 1957). This appliance consists of three parallel lines of chain in guide channels running in a complete ellipse around the whole shed from wagon side to cartage front and on again to wagon side. The chains travel at 40 ft. per min. and take 21 min. to make the complete round of 840 ft. After early teething troubles, it was now operating satisfactorily and providing greater efficiency and economy, said Mr. Flaxman. It was considerably less costly than the conventional slat conveyor and could be laid direct on the shed platform without a great deal of expensive civil engineering work.

Given adequate strength in the roof trusses there were considerable possibilities for overhead dragline conveyor equipment in conjunction with four-wheeled trolleys and preliminary experiments had been conducted with a view to its possible introduction in goods sheds for power haulage between wagon side and cartage front. Drag line conveyors, he pointed out, could also be operated by an underfloor towbar system.

The latest development was a driverless tractor which could be electrically controlled over a predetermined circuit. A copper wire track was laid on, or inset into, the existing platform surface and the truck would follow any desired path along this track without manual assistance, hauling up to five trailers with a total load of 2½ tons. (This system, developed by E.M.I. Electronics, Limited, jointly with Wessex Industries (Poole), Limited, was referred to in our May 10, 1958, issue.—Editor.) Two of these trucks had been acquired by the Western Region and an experimental installation was being laid at Newton Abbot where it would be most carefully studied.

Small Wheeled Containers

The ideal was to eliminate handling wherever possible and so far as "smalls" traffic was concerned some success had been achieved by the use of the pallet as a unit load base. The recent advent of the highly successful small wheeled container has provided a suitable receptacle of 70 cu. ft. whereby consignments of up to 1 ton can be unit loaded by sender at his premises and dispatched either throughout to consignee or to destination for distribution to various customers in the area.

Where firms had sufficient traffic suitable for making unit loads but owing to domestic problems found it difficult to adopt this method of dispatch, it was advantageous to make up s.w. container loadings at the forwarding station as a means of increasing speed of working, reducing handling at transfer points and minimising damage and claims. When the output of one Midland trader was analysed for a week selected at random it was found feasible to load an average of 16 s.w. containers daily, each for delivery direct to one consignee and each load comprising an average of 65 packages weighing nearly 11 cwt. The possibility of amalgamating sundries traffic from several traders to make up regular unit loads was also being investigated and experiments were being carried out in the use of s.w. containers to eliminate handling at transfer points. By means of a radial beam a s.w. container could be lowered from a road vehicle to street level, thus avoiding the necessity of discharging or loading the contents of the container where no loading bay existed. There were several thousands of these containers now in use on all regions of British Railways and about 3,000 more were in course of construction.

The author said that there were now some 750 special pallet vans, with an 8 ft. 5 in. wide doorway at the end of each side and fitted with partition boards and very suitable for conveying traffic on 48 in. by 40 in. pallets. They were operating on a circuit basis. In addition a prototype van had been produced with a capacity of 20 tons and capable of being loaded with double tiers of pallets.

Palletised Traffic in Standard Vans

In order to cater for palletised traffic in ordinary standard vans an expanding pallet shield was devised. This consists of two plywood shields 5 ft. by 3 ft. which are connected by telescopic pieces of scrap boiler tube and it can be expanded from 1 ft. apart to 5 ft. enabling any void space to be taken up. With the aid of the expanding pallet shield eight 48 in. by 40 in. pallets can be conveyed in a standard van, the same number as in the special pallet van.

For shipping traffic the Eastern Region had introduced a throughout palletisation scheme from Hook of Holland to Liverpool Street while the London Midland Region had provided facilities on the Heysham—Belfast service. The physical limitations imposed by normal railway vehicles in loading or unloading palletised traffic had for some time been recognised and the commercial investigation bureau of British Railways was investigating the simplification of railway methods, including the production of new types of vehicles and containers which could be loaded by fork-lift truck or other means as simply, speedily and economically as was possible.

While many floors in existing warehouses were not strong enough for the operation of normal fork-lift trucks, the development of the lighter weight battery-operated straddle-type fork truck was proving useful in some of the smaller warehouses, enabling palletised traffic to be stacked. The advantage was that instead of incorporating a counterweight in the body of the machine, it was devised with two protruding legs, parallel with the forks, thus "straddling" its load and carrying it within the track wheelbase. In consequence it could operate in a smaller space.

Traffic of a general character in full truck loads was normally dealt with in goods yards by handling direct between wagon and road vehicle, with lifting appliances available for heavy lifts. The early 6- and 7½-ton mobile crane could only travel on the public road at a speed of 4 m.p.h., and as a result, it became tied to the depot at which it was placed. The next step was the introduction of fully mobile cruiser-type cranes which could be moved fairly rapidly from one station to another and large numbers of these appliances were now in use. Experiments were proceeding in one region with a heavy-duty fork-lift truck capable of dealing with loads up to 8 tons and travelling on the road at 12 m.p.h. It soon became evident that this appliance, which could be fitted with a crane attachment, could carry out all the heavy work associated with fork-lift trucks and also that which could be performed by a mobile crane. The appliance met all demands made upon it and as a result, it was decided in particular to make this heavy-duty fork truck the standard appliance on the Western Region; 45 are now in use and 19 more on order.

This class of truck could lift containers either by the crane attachment or on the forks and experimental BD-type containers had, therefore, been fitted with troughs at the base for the insertion of forks. This method of lifting was likely to have a considerable effect on the future design of containers.

Light Alloy and Plastics Containers

Highly insulated pallet containers had recently been developed to meet one manufacturer's requirements. These containers are fitted with double doors with centre fastening and two roller runways to permit pallets, four of which comprise a load, to be positioned after being placed in the doorway by fork-lift truck. Several containers of another type are being built for palletised quick-frozen foods, said the author. Experiments are taking place with light alloy containers and a prototype has been produced with a capacity of 5 tons or 500 cu. ft. and a tare weight of only 1 ton (about half the normal tare). Similar containers of reinforced plastics are at the drawing board stage.

The Eastern Region is developing a light-alloy 8-ton capacity container capable of being discharged by air pressure for bulk flour and consideration is being given to a similar type with a gross weight of 6 tons for edible powder. One of the main difficulties with container traffic is the time taken in fixing chains and shackles and investigations are proceeding with a view to developing a simple and speedy locking device. The paper referred to a recent innovation in the container field, the tote bin system (MODERN TRANSPORT, October 25), and said that a pilot scheme using 50 bins and carried out over a period of six months from Avonmouth to Fort Dunlop to test the merits of this system, was so successful that the whole of the firm's traffic has been secured to rail and other flows of traffic are now similarly passing in tote bins. A tote bin for liquids has now been produced which would appear to have distinct possibilities.

Collapsible Containers

The Sealdbin is a collapsible vulcanised rubber container for conveyance of powdered and granular commodities. It is globular in shape and inflatable. The Portolite tank (illustrated November 22) is sausage-shaped, made from impervious coatings on multi-plies of strong woven fabrics for conveyance of liquids in bulk. When deflated, it can be rolled into a small bundle for empty return. Lastly, there is the collapsible tank which is constructed in two principal parts, an inner sleeve lining of two-ply fabric and two-ply synthetic rubber, making four layers in all, the outer frame being of aluminium alloy consisting of rigid base and top sections connected by series of folding supporting plates. These tanks are complete with filling, suction and air exhausting connections and can be suitably lined for conveyance of most liquids in bulk.

After describing recent developments in the design of bulk haulage wagons, including a new design for air-pressure discharge at 45 p.s.i., the author turned to road-rail transfer systems. Considerable research had already been devoted to this subject but with little result so far, he said. The Dutch and the German systems had been carefully studied but found unsuitable for this country; rival American methods were now under examination. So far, however, the only practicable method devised here was the 5-ton container adapted for movement by fork-lift truck. His personal view was that there should be a far greater sense of urgency devoted to the solution of this problem and that once a solution could be found it would revolutionise the transport of general merchandise. The Penman transfer system was very suitable for depots where there were only a few containers to be handled.

Chamberlain Industries, Limited, Staffa Road, London, E.10, has been appointed sole distributor throughout the United Kingdom for the Swiss-made Rival conduit-bending machine.

Recently introduced by Lamson Engineering Co., Limited, Hythe Road, London, N.W.10, is the Cabinet Junior pneumatic tube conveyor system for small offices, factories and workshops. The system can be supplied with either steel or plastic pipes taking 1¼-in. diameter carriers up to 8¾ in. long which can be used for the rapid transfer of documents, small components and tools over distances of up to 150 ft.

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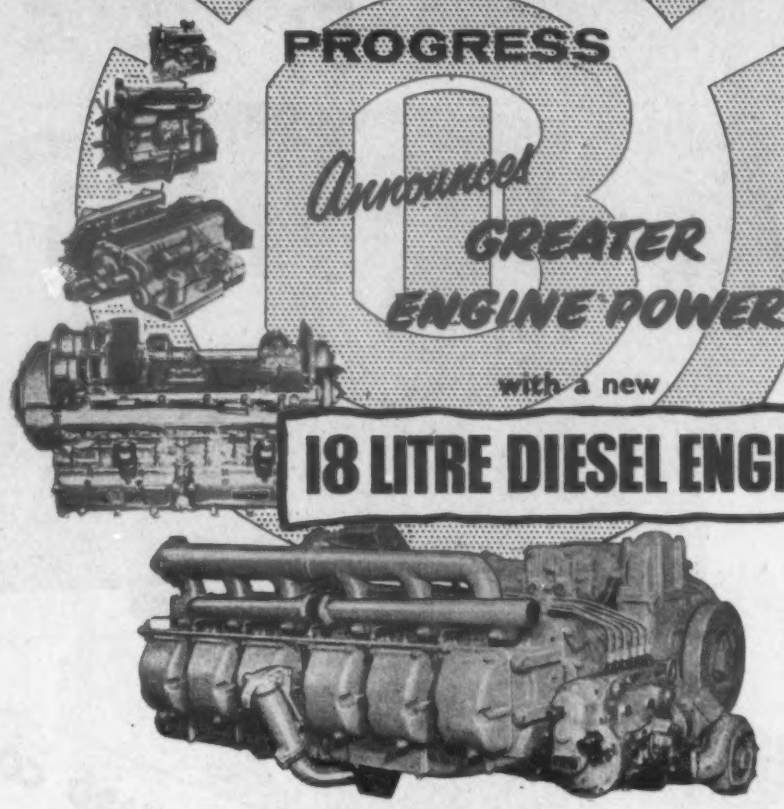

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Max. torque—890 lb. ft. at 1,300 r.p.m.
TURBO-CHARGED
Max. power—360 b.h.p. at 1,900 r.p.m.
Max. torque—1170 lb. ft. at 1,200 r.p.m.
Capacity — 1083 cu. in.
Compression ratio 16 to 1

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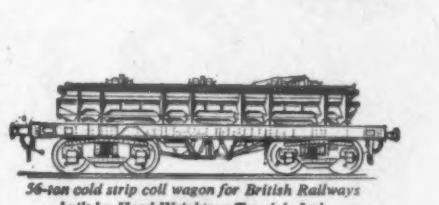
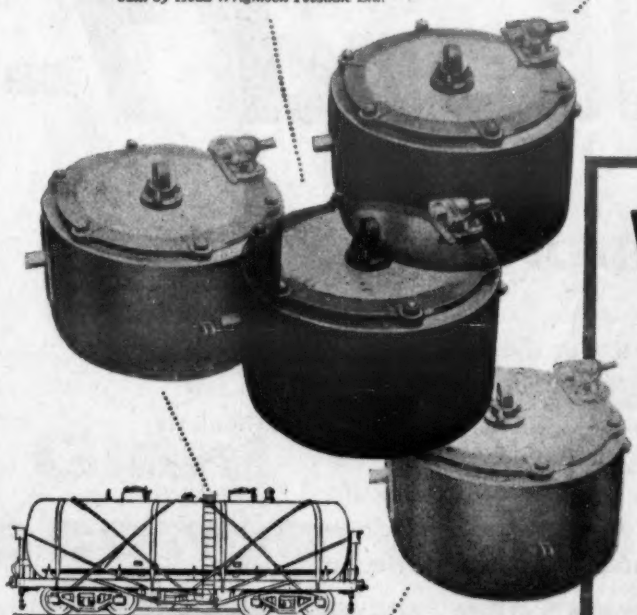


42-ton hot strip coil wagon built by Head Wrightson Teesdale Ltd. for British Railways.

56-ton coil strip coil wagon for British Railways built by Head Wrightson Teesdale Ltd.



Bogie benzine tail wagon built by Hurst Nelson & Co. Ltd. for Sudan Railways.

20-ton bogie low-sided wagon built by the Gloucester Railway Carriage & Wagon Company Limited for Ghana Railways.

VACUUM BRAKES for Railways at Home and Overseas

The wagons illustrated are only a few of the many different types of rolling-stock built by well-known British firms for British Railways and railways overseas and which are fitted with Vacuum Brakes carrying the famous V.B. mark. Manufacturers of rolling stock for railways all over the world depend upon brakes and equipment manufactured by:

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Bedford 7-ton tippers

NORMAL CONTROL

This, perhaps, is the one to choose for off-the-road work. More of its weight sits over the rear axle to give the wheels a driving bite in loose surfaces or deep mud. It has a low centre of gravity (a big help on steep slopes) and particularly easy in-and-out access for the driver. The 300 cu. in. Bedford diesel or petrol engine is mated with the Bedford 2-speed axle giving a low ratio for super-traction under heavy load or a high ratio for speed and economy when running light.

FORWARD CONTROL

This one's certainly the pick for working in restricted areas. Although it packs the same 6 cu. yards of load as the other, its overall length is only 17 ft. 5 in.—3 ft. shorter than the normal control model. This compact build, plus an unusually small turning circle, make for really easy manoeuvring in awkward places. Choice of three engines—300 cu. ins. diesel or petrol, or 350 cu. in. diesel—the first teamed with a Bedford 2-speed axle, the others with single-speed axle, 4-speed, close-ratio, synchromesh gearbox.

There's two of them—one with normal control, the other with forward control. Both have massive flat-top frames, all-steel bodies, that stand up cheerfully to crunching loads from big excavators. Both take a 6 cu. yard charge and are easy to handle, light or loaded. Both will give long, rugged service with a minimum of time out for service and maintenance.

That's only the bare bones of the story. If you're in the market now for a big tough profitable tipper, see your Bedford dealer, who can give you many more good reasons for choosing a Bedford 7-tonner. Or write for full details to Vauxhall Motors, Ltd., Luton, Beds.

Better buy Bedford...you see them everywhere

TRACTORS AT THE SMITHFIELD

Refinement And Greater Specialisation

THE machinery section of this year's Smithfield Show and Agricultural Machinery Exhibition, which ended its five-day run at Earls Court yesterday (December 12) reflected the worldwide success during the postwar years of this section of the British engineering industry and showed all the elements necessary to ensure continuing success—sound design and workmanship, competitive prices, showmanship (or salesmanship) and above all continuing development of the machines always to improve their efficiency and suitability for the job.

Spectacular as has been the postwar record of the British motor industry as a whole, the success of that section of it concerned with the design and production of agricultural tractors has been even more outstanding, aided in the past few years, it must be acknowledged, by the American interests, with their wide knowledge of world conditions and markets, that have acquired or established manufacturing and sales organisations in this country and are now an established part of the British agricultural machinery industry. For many years the major exporter of agricultural tractors, the United States lost this position to the United Kingdom in 1951, since when annual British tractor exports have remained in the region of 100,000 units while American exports have steadily fallen to barely half that level.

In the last full year, 1957, British agricultural tractor production amounted to 185,400, compared with 158,500 made in Western Germany, but whereas German exports were only 35,800, Britain sold some 115,000 of her output overseas. In the same year the United States shipped fewer than 50,000 agricultural tractors abroad. It is significant that, while both American and West German exports fell last year by roundly 10,000 units each, those of Britain rose steeply from about 90,000 in 1956 to the figure quoted above. The British industry is confident of retaining its leading position in the present year and the figure of 57,300 tractors exported by the end of June appears to justify this confidence.

Analysis of recent figures shows encouraging signs of expanding markets outside the Sterling Area and in our chief competitors' home territories. While in 1957 over 48 per cent of British exports went to the Sterling Area, 38 per cent to Europe and 5.7 per cent to the U.S.A. and Canada, the comparative figures for the first six months of 1958 are 38 per cent to the Sterling Area, 44 per cent to Europe and 6.2 per cent to North America. Roughly two-thirds of their European exports go to non-Common Market countries.

International Harvester Bradford-built B275, a more-powerful version of the B250—a best seller in Canada; new pneumatic rear toolbar for David Brown 2D; and, extreme right, Nuffield Universal Three with three-cylinder B.M.C. diesel engine

Reasons for Success

Among the reasons for the success of the British agricultural tractor is the almost universal adoption of the automotive-type diesel engine. The diesel is not only more economical of fuel than the petrol or petrol-paraffin engine, it is also far more reliable and durable and less given to temperament when left out of doors. Early fears of maintenance difficulties with the fuel-injection equipment have proved groundless, the service facilities set up by the various manufacturers having generally been adequate even in the remoter regions. The balance should swing even more in favour of the diesel engine as the new C.A.V. distributor-type pump comes into wider use. This unit, which is already standardised on Massey-Ferguson and certain David Brown tractors, is cheaper in first cost than the in-line pump, can provide easier cold starting and a wider latitude in determining the shape of the power curve to match a particular engine duty and its design is such that calibration and phasing cannot get out of adjustment.

Certainly, the diesel engine is not so readily started by hand and generally requires electric starting equipment and a well-maintained high-capacity battery, but even this is not a necessity today if use is made of the Simms Tensec inertia hand starter. This unit, which is interchangeable with the normal electric starter motor, was seen at the show, modified to Ford Motor Company requirements, fitted to a Fordson Power Major tractor intended for export markets where temperatures are above 30 deg. F.

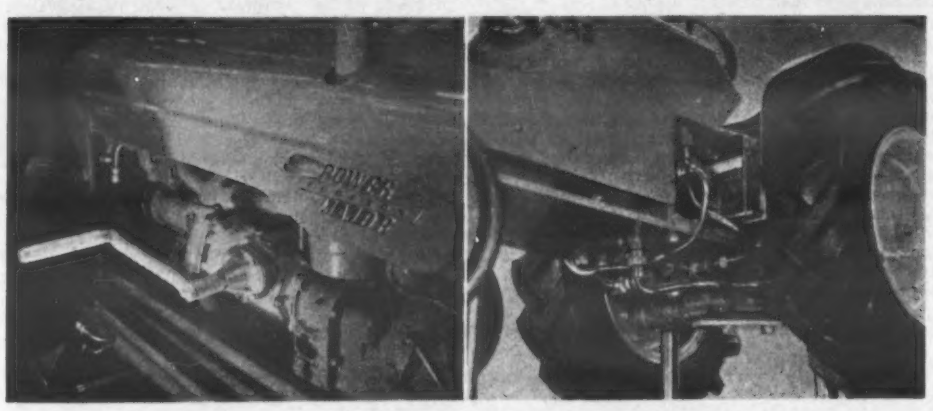
Good Production Engineering

Other reasons for success are the development of matched implements for rapid toolbar mounting and dismounting, the versatility and excellence of the hydraulic controls and the design and production engineering achievements that have permitted the development of wide ranges of types to meet more adequately particular requirements without adding materially to cost. In the past, quantity production has generally resulted in a degree of standardisation that involved a compromise acceptance by the user of the equipment nearest to his requirements or the high cost of non-standard modification and fitments. The range at Earls Court this week must have been the widest ever shown in any country. Most manufacturers showed various production options for standard tractors at small extra cost, perhaps typified by the new Fordson Narrow Dexta, the new David Brown Narrow 2D and the new International Harvester Bradford-built Hi-Clear B250 and B275.

Not a little of the success is also due to the component manufacturers, the contribution in the hydraulics field by such firms as Dowty, Lucas, Plessey and Spenborough having been notable. The live power take-off, which enables the tractor to be stopped without breaking the drive to power-driven equipment, has been a cost saver by removing the necessity for a separate power unit on tractor-hauled machines, while the introduction this year by Automotive Products of a new Borg and Beck 10-in. combined main-drive and power take-off clutch controlled by a single pedal marks a further advance in this direction.

A noticeable trend at the show was the use of more powerful engines for tractors in the medium-power range. The Nuffield Universal Four tractor, which is fitted with the B.M.C. 3.4-litre direct-injection diesel engine, has been uprated from its original output at the flywheel of 45 b.h.p. to 53 b.h.p. at 2,000 r.p.m. in current form. International Harvester Company's popular B250 has been joined by the 35-b.h.p. B275, which retains the features of self-energised disc brakes and lockable differential and has in addition an eight-speed transmission and full-power live power take off. The same company's new Farmall B450 wheeled tractor has a 55-b.h.p. diesel engine. Very high specific power for a small diesel engine is provided by the Perkins Four 99, the 1½-litre 35-b.h.p. unit that has been adopted as the standard equipment for many of the world's combine harvesters and was well in evidence.

A hint as to the form of the farm tractor of the future might well have been contained in the hydrostatic transmission units shown and demonstrated at Earls Court by both the Dowty and Lucas concerns. This form of transmission, which replaces the conventional clutch and gearbox, and sometimes also the differential, and provides an infinitely variable control over the speed range in both directions through a single lever or by automatic means, was first given practical expression, in a modified Fordson Major tractor, by the N.I.A.E. four years ago. Since the shape of current tractors is governed largely by its transmission system, the adoption of hydrostatic transmission could well initiate an entirely different design of more functional form.



Fordson Major tractor fitted with Simms inertia starter; right, a working model tractor equipped with hydrostatic transmission developed by Joseph Lucas

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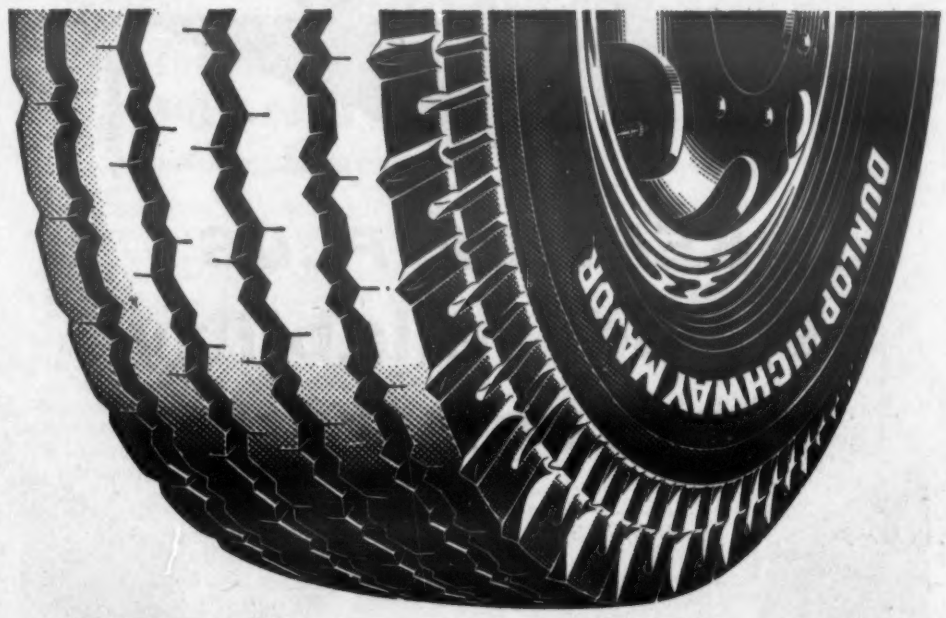

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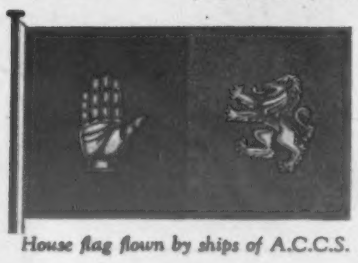

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UNUSUAL RAILWAY TANK WAGONS

For Mineral and Edible Oils

AN attempt has been made by the Nigerian Railway Corporation, in association with the Crown Agents, to solve the problem of empty haulage inherent in the conventional type of rail tank wagon, precluded for use for vegetable oils by reason of contamination difficulties.

Dual-Purpose Wagons

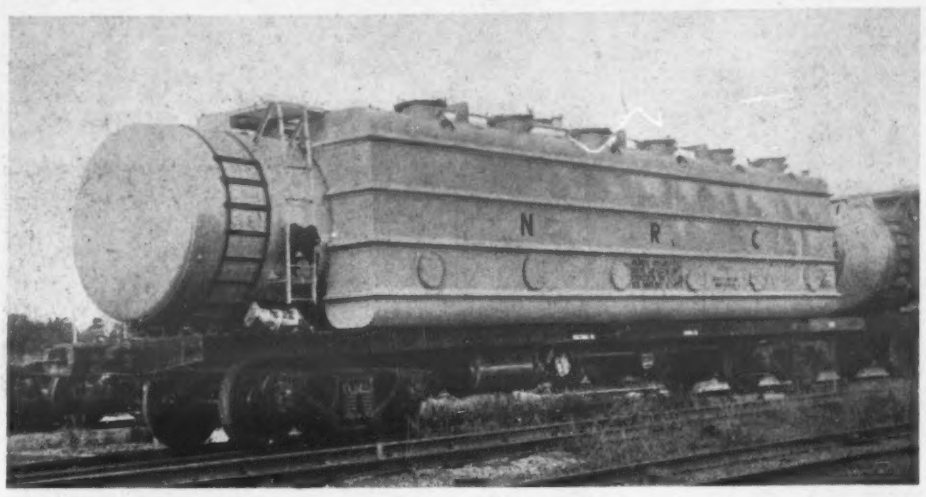
Ten dual-purpose tank wagons as illustrated on this page have been supplied by the Société Métallurgique d'Enghien St. Eloi, to the requirements of Mr. R. K. Innes, formerly chief mechanical engineer and now general manager, Nigerian Railway Corporation, for transporting high flash point mineral oils from Lagos to Kano, a distance of 700 miles, and edible groundnut oil from Kano to Lagos. Extensive inquiries revealed that no tank wagon type existed designed for the immediate alternate conveyance of mineral and edible oils. Consideration was given to the use of plastic bags which would be inserted into a tank for carrying edible oil in one direction, and removed when the tank was required for conveying mineral oil on the return journey.

This possibility was abandoned after investigation demonstrated that it did not appear practicable to obtain a bag completely impervious to either type of oil, whilst being susceptible to simple, rapid and positive cleaning, sufficiently strong to withstand normal handling for insertion and removal, and suitable without complicated neck reinforcement to minimise frictional wear when in inevitable motion in a moving tank vehicle. For obvious reasons expendable bags did not commend themselves.

Separate Tanks

It was consequently decided that separate tanks would be necessary for the mineral and edible oils, and it was concluded that the most suitable arrangement would involve a central cylindrical tank of the orthodox sealed type for the inflammable mineral oil, with two pannier tanks of the lightweight vented-to-atmosphere type for the comparatively inert edible oil. The cylindrical tank has a capacity of 7,200 gallons of mineral oil, as opposed to the 9,000 gallons capacity of the standard tank wagon in service in Nigeria. It is of welded construction, suitably baffled and anchored to the underframe by two steel straps over each bogie centre. The ends and the lower third of each cylindrical tank section are 29/64th in. thick and the top section is $\frac{11}{32}$ in. thick. Seam welding was accomplished with a submerged arc on automatic Lincoln-weld machines. After X-ray examination a final hydraulic test up to 60 lb. per sq. in. was given.

The two pannier tanks have a combined capacity of 5,746 gallons of edible oil; loading is balanced by a flexible equalising pipe which passes under the central tank. These tanks are of welded construction in 15/64th in. thick, quarter hard ARMg3 aluminium alloy and are secured to the central cylindrical tank by five pairs of straps joined by turnbuckles to facilitate removal when required, without disturbance of the central tank.



One of 10 dual-purpose tank wagons built for the Nigerian Railway Corporation by the Société Métallurgique d'Enghien St. Eloi

Construction Method

Wearing and insulating strips of belting are fixed between the aluminium alloy tanks, and all contacting and supporting surfaces. Each tank comprises a top and bottom shell welded together longitudinally to enable baffles and stiffeners to be welded in prior to final assembly, and was submitted to a 6 lb. per sq. in. hydraulic test. Sharp corners and protuberances have been avoided and the manufacturers have succeeded in demonstrating a standard of welding consistent with the especial need for smooth surfacing.

Cleansing pipes, suitably perforated, run the whole length of the tanks. One is near the top and the other near the bottom; they can be extracted reasonably readily for inspection and cleansing of the perforations when necessary. Six manholes are provided at the top of each tank, together with six side inspection covers. The equalising pipe and bottom discharge gear are arranged to be removable, but they can be cleaned by hosepipe attachment without removal. The discharge pipes have distinct flange dimensions to prevent accidental error and the making of a mineral oil—edible oil discharge connection. The 42-ft. underframe is of welded construction and has two deep longitudinal channel sections, with outriggers and side sills to support the pannier tanks. A3 Ride Control long-travel spring bogies, with built-in snubbers have been fitted and these tank wagons are provided with Hoffman roller-bearing axleboxes.

New Manchester Bus Station

(Continued from page 3)

supplementary openings in the shelter sides so that passengers may alight from a second bus arriving on the stand while a bus in front is in process of loading.

Completed in Stages

This is believed to be the first two-storey structure in this country to be built entirely on structural light-alloy supporting columns. The shelter itself was constructed in stages, starting at the west end, each section being available for passengers as soon as it was completed. The cost was £54,000. Designed by the city architect, Mr. Leonard C. Howitt, and erected by Robert Carlyle and Co., Limited, Manchester, the primary design objectives were a functional and easy-to-maintain structure. One of its more striking features is the use of extruded Duralumin H-section supporting columns and the extensive use of other aluminium alloys for the window frames and guide rails. This helps to simplify maintenance problems as aluminium needs no painting or other protection against corrosion.

Duralumin Roof Supports

The two-storey central block has a 21-ft. radius reinforced concrete shell barrel roof, 2½ in. thick, and a first floor of 4-in. thick two-way reinforced concrete slabs cast in situ. The extruded Duralumin columns are 8 in. by 4 in. with 14 in. by 4 in. columns at each corner made up of extruded sections welded together. The wall thickness of the columns is 0.28 in. Throughout the remainder of the shelter the 4-in. thick concrete slab roof—all of which was cast in situ—is supported at intervals of approximately 9 ft. by extruded 4-in. square Duralumin columns interspersed with 6-in. by 4-in. double-hollow sections, one part of which is used as an integral rain-water down-pipe. All the structural light-alloy sections (over 12 tons) and plates were extruded by James Booth and Co., Limited, Birmingham, and supplied to Saunders-Roe (Anglesey), Limited, of Beaumaris, Anglesey, which undertook the welding of the base plates, column caps and bearing plates for the roof supports, and also the fabrication of the door pillars and frames, and the hundreds of supporting columns—some of which are made up of two extruded sections and so required longitudinal welds of up to 20 ft.

One of the major architectural problems was to keep the layout of the shelter sufficiently flexible for changes in the positions of the 23 bus stands to be made at short notice. This was achieved by designing the building on a 9-ft. grid plan so that the entrances, exits and windows can be interchanged as required. The extruded aluminium window frames, supplied by Allan M. Williams (Chester), Limited, of Coventry, are fixed to the supporting columns by cadmium-plated screws and tension plates, with the ¼-in. plate-glass windows held in the frames by similar screws and putty.

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SOCIAL AND PERSONAL

Council on Tribunals

IT was announced by the Lord Chancellor on Wednesday last week that Lord Reading, former Minister of State for Foreign Affairs, is to be chairman of the Council on Tribunals which will supervise the working of administrative tribunals and inquiries under the Tribunals and Inquiries Act. This received the Royal Assent in August. The council's function will be to keep under review and report on the constitution and working of administrative tribunals, and of those administrative procedures which involve the holding of statutory inquiries. There is to be a Scottish committee headed by Sir Hugh Rose. The council will have 12 members besides the chairman. The member for industry and finance is Lord Strathalmond (formerly Sir William Fraser), sometime chairman of the British Petroleum Co., Limited.

* * *

We record with regret the death of Mr. A. Potter, a recent partner in Davies and Robson, transport accountants and consultants. Due to illness he had retired on November 30.

* * *

Mr. Alan Hess has been appointed public relations manager of the Simms Motor and Electronics Corporation, Limited, which comprises responsibility for public relations, advertising and publicity for all the 23 companies in the Simms group.

* * *

Mr. Alfred A. Pigg, who has been manager, France, for British European Airways, since 1956, has been appointed regional manager at head office in succession to Mr. W. C. Gaskin, who is retiring. Mr. Pigg expects to take up his appointment at the end of the year. Before his appointment as manager, France, Mr. Pigg was B.E.A. manager, Switzerland, since 1952. He joined B.E.A. in 1946, when the corporation was first formed, and became the first manager, Denmark. His experience with British air transport extends over more than 25 years both at home and overseas, and early in his career he worked for Imperial Airways which he joined in 1933. On the formation of B.O.A.C., Mr. Pigg returned to head office, but shortly after the outbreak of war, he was appointed B.O.A.C. station manager first at the Prestwick terminal of the North Atlantic return ferry service and later at Leuchars in connection with the important wartime U.K.—Stockholm air link. At the end of the war, he became B.O.A.C. special representative in Copenhagen until his appointment as B.E.A. manager there in 1946.

Mr. A. A. Pigg

* * *

At the next meeting at the London School of Economics on December 17, a paper will be read by Mr. G. H. Hinds, O.B.E., electronics advisory officer, British Transport Commission, on "Computers and Railways." It will be illustrated by a short film.

* * *

We regret to record the death of Mr. W. Ingleson, A.M.Inst.T., assistant transport manager, Cadbury-Fry joint transport department, at Bournville. He was 59. Mr. Ingleson was a member of the council of the Mansion House Association on Transport and was associated with other transport organisations.

* * *

The following appointments have been announced in connection with the traffic reorganisation of the Western Region:

Mr. H. E. R. Bastin, to be district traffic superintendent, Bristol.
Mr. H. E. Hallett, to be operating officer, divisional traffic manager's office, Bristol.
Mr. N. S. Taylor, to be commercial officer, divisional traffic manager's office, Bristol.

* * *

Kenneth Horne's amusing comedy *The Devil Was Sick* was chosen by the Southern Region Dramatic Society for its autumn production; it was staged at a number of hospitals in Surrey and at the Southern Region orphanage at Woking before presentation at the Scala Theatre on December 3. It was enthusiastically received, and deservedly so, by a large audience which included the president of the Society, Mr. Charles Hopkins, general manager, Southern Region.

* * *

Further changes in the management of the Irish air companies Aer Lingus and Aerlinte Eirfeann are announced as part of a general plan designed to achieve closer management integration in the companies. Mr. T. O'Briain, formerly assistant commercial manager, becomes commercial planning manager, and Mr. A. Donohoe, accountant, has been appointed chief accountant. Two new departments—services department and personnel department—have been set up to handle the work of the former staff and services department.

* * *

At the annual dinner of the Sussex group of the Institute of Transport, and in the presence of the president of the Institute, Major-General G. N. Russell, a cheque was presented to Mr. L. S. Webb, a Southdown Motor Services conductor at Chichester. This was a prize awarded by the British Electric Traction Co., Limited, to the candidate being an employee of a road passenger transport company achieving the highest aggregate of marks in the Royal Society of Arts examinations for a diploma in road transport subjects. The chairman of the group, Mr. A. S. Woodgate, who is general manager of Southdown Motor Services, made the presentation.

* * *

At a small gathering at the Italian Trade Centre in Old Burlington Street, London, W.1, the Italian Ambassador, Count Vittorio Zoppi, presented to Mr. L. H. K. Neil, former Continental traffic and shipping manager of the Eastern Region of British Railways, the insignia of Cavaliere Dell' Ordine Al Merito della Republica Italiana (Knight of the Order of Merit of the Republic of Italy). Mr. Neil retired from that position last year. Among those present were members of the Italian Embassy, including the commercial counsellor, Signor Clemente Boniver; Mr. H. C. Johnson, general manager, Eastern Region; Mr. S. A. Claydon, Continental traffic and shipping manager, Eastern Region; Mr. R. Weber, managing director of the Anglo-Belgian Ferry Company; and Avvocato M. Gioncada, Italian representative of the same company.

I.o.T. South Western Section

SPEAKING as guest of honour at the annual luncheon in Exeter last week of the South Western section of the Institute of Transport, Major-General G. N. Russell, president of the Institute, referred to the importance of its status. This, he said, would gain materially by the recent tightening up of the qualifications for membership and by emphasis on the need for passing the Institute's examinations, study for which presented far-reaching opportunity for the younger men coupled with the chances of engaging in debate and social intercourse. He was responding to the toast of the Institute proposed by the Mayor of Exeter (Councillor Charles Rew). Presiding at the function, Mr. W. H. Geere, chairman of the section, welcomed the guests, who included the Lord Mayor of Plymouth and other civic dignitaries. Messrs. C. H. S. Pickett, T. L. C. Strange, J. McRill and S. W. Nelson also spoke.

* * *

For 25 years Mr. G. N. C. Swift, Clerk to the Cumberland County Council, has sat at the quarter sessions, and has never had a driver or conductor of any public service vehicle before the court. He mentioned this at Keswick on December 1 when he presented road safety awards to 200 drivers and conductors at a dinner arranged by the Cumberland Motor Services, Limited. Mr. H. H. Merchant, director and general manager, presided.

* * *

As already recorded in our columns, Mr. H. Tudor Williams, M.C., M.Inst.T., has retired as transport supervisor, Scribbans-Kemp, Limited, but is retained in an advisory capacity for the time being. He intends also to practice as a transport consultant. Mr. Williams was associated with Mr. A. G. Marsden in the Cadbury distribution organisation at its Bournville headquarters for many years and subsequently served with him at the Ministry of Food, Transport Division. He joined the Scribbans - Kemp company shortly after the end of the 1939-45 war. Mr. Williams remains a member of council of the Mansion House Association on Transport.

Mr. H. Tudor Williams

* * *

We record with great regret the death on December 8 of Mrs. Clare Garcke, widow of the late Mr. Sidney E. Garcke.

* * *

Rotorports, Limited, has appointed Mr. H. M. Berney a director of the company. He will be responsible for property and development interests.

* * *

The annual general meeting of corporate members of the Institute of Transport will take place at 5.45 p.m. on December 15 at 80 Portland Place, W.1.

* * *

Mr. S. B. Lovegrove has been appointed assistant line traffic officer (operating), Crewe, London Midland Region, B.R. He began his railway career at Stratford in 1920 as a junior clerk and his last position was district operating superintendent, Liverpool Lime Street.

* * *

British Road Services announced this week that although Mr. H. Rossington has relinquished the post of district manager, London general haulage district, on grounds of ill health, it is hoped that his health will recover sufficiently to enable him to take up new duties within the undertaking in due course.

* * *

The following appointments are announced by the London Midland Region of British Railways:

Mr. F. H. Newman, to be assistant (modernisation) to operating officer, Euston (located Crewe).
Mr. A. S. Turner, to be assistant (passenger services) to operating officer, Euston.
Mr. C. H. W. Barnes, to be district estate surveyor, East Lancashire district, Manchester.
Mr. J. W. G. Turner, to be district road motor engineer, Blackburn.

* * *

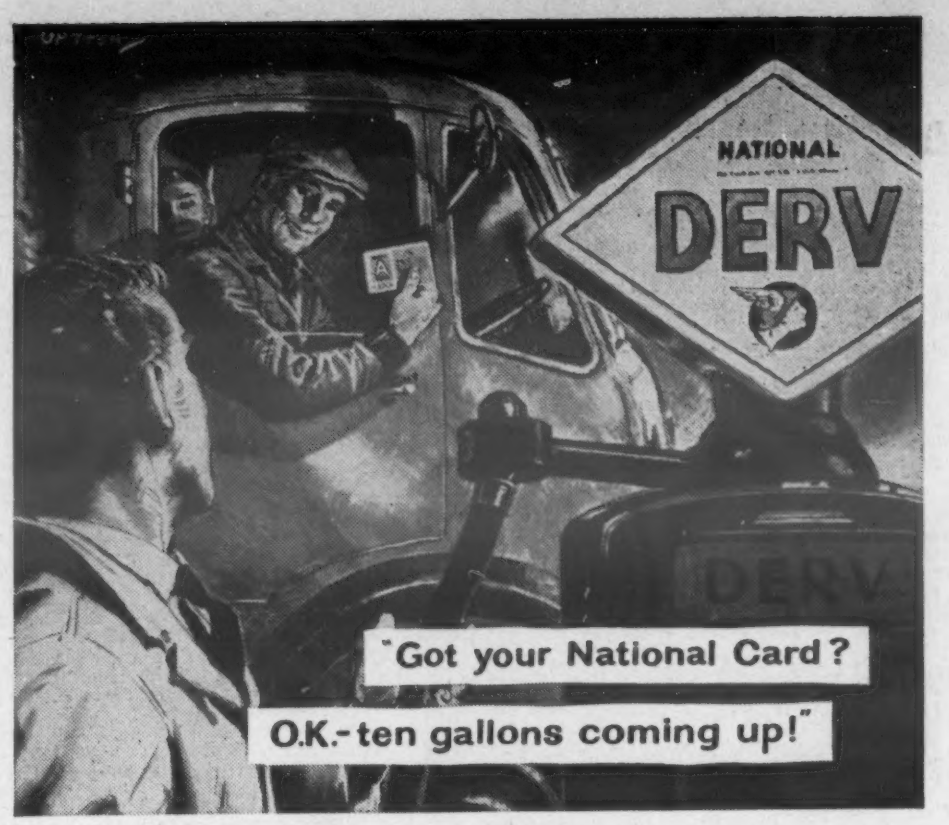
The canteen at the central works of the Midland "Red" company at Edgbaston, Birmingham, was the scene of the presentation of safety awards, under R.O.S.Co. auspices, to drivers, conductors and conductresses from four adjacent garages in the Black Country. This was the first occasion on which a function of this kind had been held in the works canteen. Mr. R. Brandon, O.B.E., traffic manager, officiated as chairman for the evening. Premier award went to a driver with a 24-year record.

* * *

We regret to record the death, at the age of 90, of Mr. E. C. Cox, C.B.E., M.V.O., T.D., who was traffic manager of the Southern Railway, from 1930 until he retired in 1936. He joined the South Eastern Railway in 1883. He was appointed superintendent of the line for the South Eastern and Chatham Railway in 1911 and at that time ranked as the youngest railway superintendent in the kingdom. In 1919 he was elected chairman of the Superintendents' Conference at the Railway Clearing House, and subsequently gave voluminous evidence on behalf of the railway companies before the Rates Advisory Committee and the Railway Rates Tribunal. Following the grouping of the main-line railways in 1923, he was appointed chief operating superintendent of the Southern Railway, becoming traffic manager of the undertaking in 1930. Mr. Cox was a foundation member of the Institute of Transport.

* * *

The Singapore Government has announced the appointment of Mr. Stanley Johnson, A.C.A., M.Inst.T., F.R.S.A., as chairman and general manager of the Singapore Harbour Board. He is 45 years of age. Mr. Stanley Johnson served his articles with Sir Leonard Coates and Company, chartered accountants, of Leeds and London, and entered the service of the Singapore Harbour Board in 1939. During the war of 1939-45 he served in the Royal Navy as paymaster lieutenant. He returned to Singapore at the end of the war and assisted in the reorganisation of the Harbour Board after the Japanese occupation. He was appointed chairman and general manager of the Singapore Harbour Board in 1955 and has been acting chairman and general manager since the retirement of the former chairman, Mr. P. Chrimes, some times ago. Mr. Johnson is one of the adopted sons of Mr. Vane Morland.



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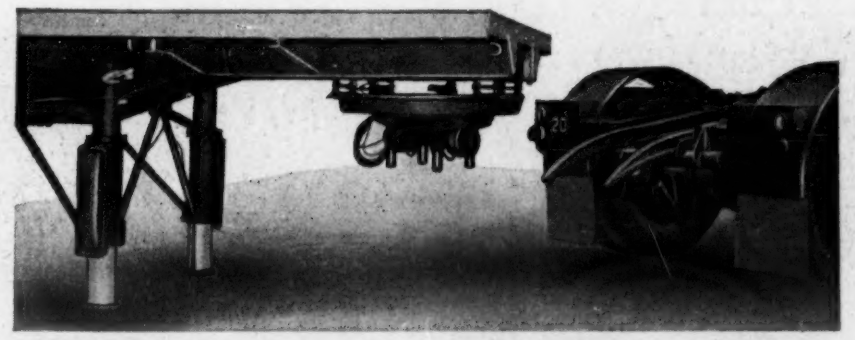

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IMPORTANT CONTRACTS

£1½ Million Land-Rover Order

THROUGH its Australian subsidiary, the Rover Co., Limited, Solihull, has been awarded a contract for a "very substantial" number of Land-Rover ¼-ton four-by-four vehicles for the Australian Army. The vehicles will be built by Rover Australia Pty., Limited, at its Sydney plant and they will incorporate a high content of Australian materials and labour. With spare parts, the total value of the order is said to be worth about £1,500,000. Land-Rover sales in Australia were already valued at about £6,000,000 a year before the receipt of this order.

Radio for New Ellerman Liner

Comprehensive Marconi Marine communications equipment and radio navigation aids have been installed in the new Caledon-built Ellerman cargo liner *City of Hereford*, 7,700 tons.

Diesel-Hydraulic Shunters

Three 300-h.p. diesel-hydraulic shunting locomotives similar in design to those already in service have been ordered from North British Locomotive Co., Limited, by the British Transport Commission for use in the London Midland Region.

District Line Bridge Reconstruction

London Transport has placed a contract with the Cleveland Bridge and Engineering Co., Limited, Darlington, for the reconstruction of the decks of two bridges carrying the District Line over the East London Line at Whitechapel Station. The value of the contract is approximately £15,500 and the work should be completed in three months.

American Order for Leyland Engines

An order from Costa Rica for 60 diesel engines, with gearboxes and auxiliaries, to be used as conversion units in lorries of various makes has been received by Leyland Motors, Limited. Placed by the Leyland agent in San José, Almacen Electra S.A., the order calls for 20 engines of 350 cu. in. and 40 of 375 cu. in. capacity.

German Vehicle Plant for Arabs

The German Klöckner-Humboldt-Deutz group has announced that it has been awarded a contract by the United Arab Republic for the erection of a motor vehicle works. Initial capacity provides for the production of 3,500 three- and five-ton lorries and up to 4,000 air-cooled diesel engines annually. Within eight years the output is to be increased to 6,000 vehicles a year. Factory equipment and machine tools to the value of DM40 million will be supplied by Germany in the first phase.

British International Harvester Orders

Consolidating recent successes in the Canadian market, which now total more than 4,600 Bradford-built tractors in less than two years, International Harvester Company of Great Britain, Limited, has received a further record order from this source. The latest contract is for 700 of the new B275 tractor and a further 500 of the B250 tractor, which is already a best seller in Canada, with a total value of nearly $2 million. International Harvester has also announced a record order from its Egyptian distributor, Tractor and Engineering Company, Cairo, for British-made tractors. With a value of £200,000, the contract calls for numbers of the new Doncaster-built Farmall B450 wheeled and BTD6 tracked tractors as well as the B250 tractor, farm implements and International-Drott skid shovels.

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TENDERS INVITED

THE following items are extracted from the Board of Trade Special Register Service of information. Inquiries should be addressed, quoting reference number where given, to the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London, W.C.1.

December 20—Sudan.—Sudan Railways for one locomotive WEIGHING and BALANCING TABLE. Specification from the office of Controller of Stores, Atbara. (ESB/29614/58.)

December 22—Portuguese East Africa.—Ports, Railways and Transport Department for four 10,000-litre RAILWAY TANK WAGONS for petrol. Tenders to the Ports, Railways and Transport Department, Lourenco Marques.

December 29—Pakistan.—Ministry of Communications for 30 or 87 5 ft. 6 in. gauge bogie OIL TANK WAGONS (dismantled) for the North Western Railway. Tender documents from the office of the Director-General (Railways), Railway Division, Ministry of Communications, Room No. 342, 2nd Floor, Secretariat Building, Adjacent Parliament House, Shahrah Kamal Ataturk, Karachi, price Rs.100. (ESB/27641/58.)

December 29—Portuguese East Africa.—Ports, Railways and Transport Department for large quantities of PERMANENT WAY EQUIPMENT. Tender documents through local agent from Railway Warehouse, Lourenço Marques. (ESB/26144/58.)

December 30—Portuguese East Africa.—Ports, Railways and Transport Department for eight THIRD-CLASS RAILWAY COACHES. Tender documents through local agent from the Railway Warehouse, Lourenço Marques. (ESB/25619/58.)

December 30—Ceylon.—Gal Oya Development Board for one 40-45 h.p. diesel WHEELED TRACTOR, six 80-90 h.p. diesel TRACKED TRACTORS, two 100-110 h.p. diesel GRADERS, one 600-gal. diesel fuel ROAD TANKER and 15 5-ton capacity four-wheel TRAILERS for cane transport. Photocopies of tender documents from Export Services Branch, B.o.T., price 5s. (ESB/29912/58.)

SHIPPING and SHIPBUILDING

Manchester Quay Delivery Bureau

IN April, 1957, the Manchester Ship Canal Company set up a quay delivery bureau to enable importers, agents and haulage contractors to give advance notice of their intention to collect traffic from the Manchester Docks. The main objects of the scheme were to help have men and mechanical equipment available in the right places at the right time. With a view to extending the functions of the bureau, the company has sought the advice of representatives of the road haulage industry and a small committee was formed comprising the area secretary of the Road Haulage Association (N.W. area), the district manager of British Road Services and representatives of the company. Following further consultation with the Manchester Chamber of Commerce, the Institute of Shipping and Forwarding Agents (Manchester branch), Tradets' Road Transport Association and the Manchester Steamship Owners' Association, it was decided to introduce an experimental scheme, subject to review after six months of operation, under which some preference would be given to pre-advised vehicles arriving between specified hours during the morning and afternoon.

This new scheme will be introduced on January 1, 1959; under it hauliers are asked to telephone their requirements before 4 p.m. on the day before the intended date of collection and at the same time advise whether their vehicle(s) will arrive between 8 and 10 a.m. or 1 and 2 p.m. Vehicles advised for arrival within one or the other of these periods and duly showing up on time at the appropriate delivery points will receive preferential attention over any unadvised vehicles already in attendance at the berth. The telephone number is Trafford Park 2411 and the following extensions should be asked for:

Extension 146	for General Cargo, Cotton, Cotton Waste
Extension 316 or Extension 224	for Timber
Extension 254	for Grain ex No. 2 Elevator

The scheme does not cover deliveries of traffic imported by the short-sea and coasting services operated by J. T. Fletcher and Company, Wilson, Son and Company, British Amsterdam Maritime Agencies, and Coast Lines, Limited, which prefer to continue with their existing arrangements.

London Port Charges Raised

INCREASES in certain charges with effect from January 1, 1959, are announced by both the Port of London Authority, the London Association of Public Wharfingers and the Federation of London Public Wharfingers. The last general increase was in July, 1957. The surcharge on P.L.A. dues and rent on vessels using the Authority's docks and river moorings will be increased by raising the existing surcharge of 20 per cent to 22½ per cent. The surcharge on rates for hire and use of plant (other than the supply of tugs for towing vessels and craft) will be raised from 25 per cent to 30 per cent.

Charges for import goods, shown in the schedules for quay delivery, North American goods, animals and birds, and for landing rates and other charges in import goods, will be increased, the surcharge rising from 45 per cent to 52 per cent, and on others from 47½ per cent to 54½ per cent. The surcharge on rates and charges on goods for shipment will be increased from 35 per cent to 42 per cent. The London Association of Public Wharfingers announced that its surcharges on import goods and export goods would be similarly raised. The Federation of London Public Wharfingers states that its surcharges on rates and charges on import goods will be raised as follows:

Immediate delivery rates surcharge to be increased from 47½ per cent to 54½ per cent, and landing rates and other charges surcharge to be increased from 45 per cent to 52 per cent. The surcharge on rent on import goods will remain unchanged at 25 per cent, but the surcharge on rates and charges (other than rent) on goods for shipment will be increased from 35 per cent to 42 per cent. The surcharge on rent on goods for shipping will remain unchanged at 25 per cent, and the surcharge on rates for discharging and loading vessels will also be unaltered at 30 per cent.

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FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

E. G. Brown

E. G. Brown and Co., Limited, shows a net profit for year ended September 30 of £16,281 (£17,713), and dividend 7 7-24 per cent (8¼). Current assets £212,530 (£234,078), liabilities £49,247 (£72,409).

East Kent Road Car

A net profit of £79,428 is shown by the East Kent Road Car Co., Limited, for the year ended September 30, 1958, compared with £76,768 for the previous year. Traffic receipts, etc., were £2,093,970 (£1,974,652). Dividend is 8¼ per cent (same).

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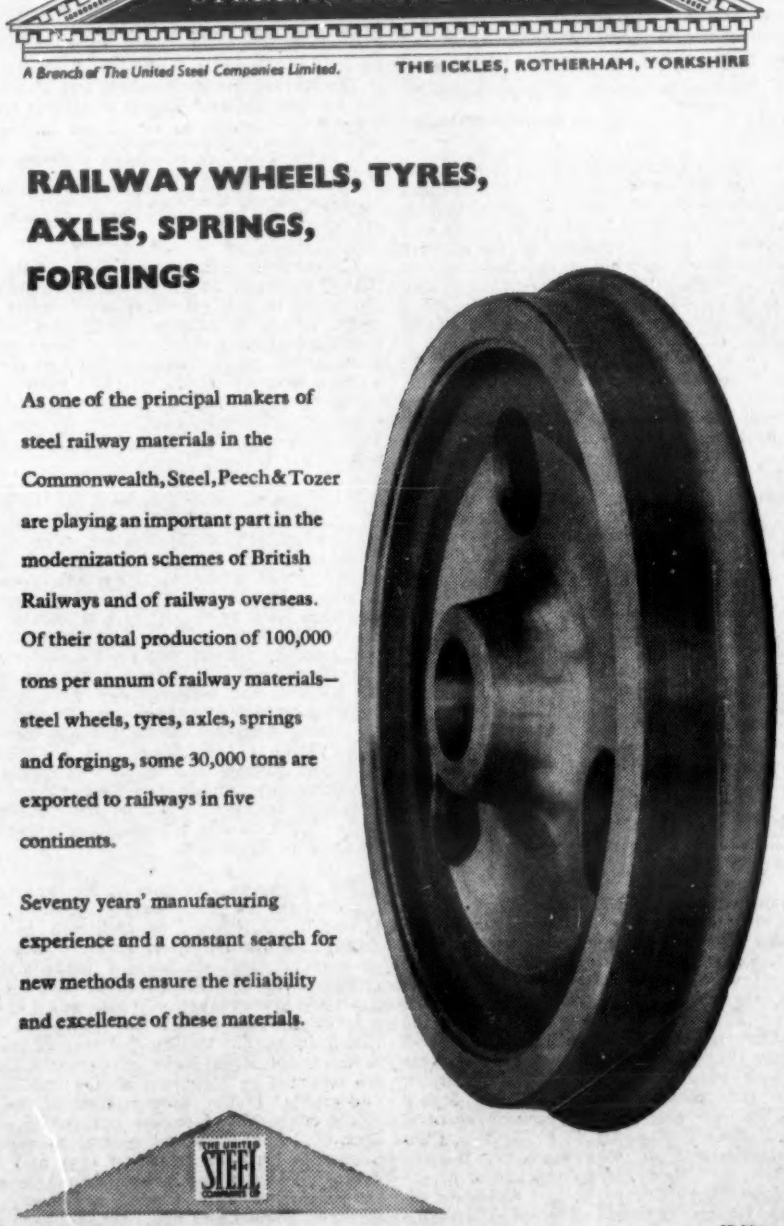
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